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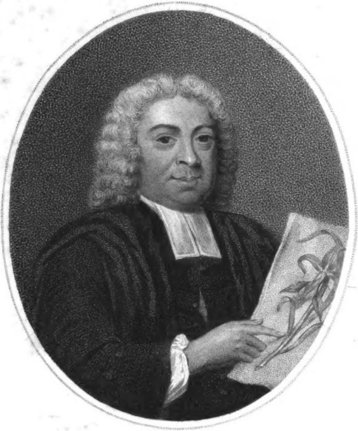

Engraved by Jas. Heath.

James Dillenius, M.D.

From an Original painting, in the picture Gallery at Oxford.

ANNALS

OF

BOTANY.

EDITORS,
CHARLES KONIG, F.L.S.
AND
JOHN SIMS, M.D. F.L.S.

Multum adhuc restat operis, multumque restabit, nec ulli nato post mille sæcula præcludetur occasio aliquid adhuc adjiciendi.

SENECA, Epist. 64.

VOL. II.

LONDON:
PRINTED FOR THE EDITORS
By R. *Taylor and* Co. 38, *Shoe-Lane, Fleet-Street.*
TO BE HAD OF T. CURTIS, N° 3, ST. GEORGE'S CRESCENT,
NEAR THE OBELISK, ST. GEORGE'S FIELDS.
SOLD ALSO BY J. WHITE, FLEET STREET; H. D. SYMONDS,
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1806.

BIBLIOTHECA
REGIA
MONACENSIS

TO

THE RIGHT HONOURABLE

CHARLES GREVILLE,

ONE OF HIS MAJESTY'S MOST HONOURABLE PRIVY COUNCIL,
VICE PRESIDENT OF THE ROYAL SOCIETY, &C.

THIS VOLUME

OF THE

ANNALS OF BOTANY

IS

RESPECTFULLY INSCRIBED

BY

THE EDITORS.

ADVERTISEMENT.

The Editors of the Annals of Botany have received so many flattering testimonials from botanists of the first repute, both from abroad and at home, of the satisfaction with which their labours have been received, that it is not without regret they find themselves under the necessity either of totally discontinuing the work, or of changing the plan of it, so as to reduce in some measure the expense at which it has been hitherto conducted. No arrangement, however, having as yet been made to enable them to proceed in the undertaking, the Editors wish it to be understood that the Annals of Botany will probably be henceforth discontinued; and the *two volumes* are now offered to the public as an *entire work*, containing many interesting original articles, besides a number of foreign tracts, which the English botanist cannot easily obtain access to elsewhere. The temporary matter occupies so very small a portion of this publication, that it cannot be thought to diminish the value of the numerous essays contained in it, whose importance may be deduced from the frequency with which they have been already quoted in the writings of the most learned botanists.

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P. 97. l. 26. *for* Helice *read* Cymodocea.

P. 539. l. 16. *for* a superior *read* an inferior.

ANNALS OF BOTANY.

I. *Account of the Observations on the Irritability of the Stamens of Berberis vulgaris made by* KOLREUTER.

AMONG the variety of pleasing subjects of investigation which offer themselves to those botanists whose labours are not confined to counting the stamens of a handful of plants, one of the most remarkable is that kind of vitality of the fibre which causes a more or less perceptible contraction on the application of a proper stimulus, and is now universally denoted by the name of irritability. It cannot be doubted that this faculty is the great primary cause of most of the phænomena of vegetable life as they present themselves to us. All the operations we see go on in a plant, from the first unfolding of the embryo to its final dissolution, with all the various stages of growth and decline between, the action of the vessels on the sap, the different secretions, the process of fecundation, the fall of the leaves, cannot in any way be rationally accounted for without the admission of this principle, and of its accumulation or diminution variously modified by extraneous circumstances.

This principle manifests itself in a more striking manner in those plants which on that account are called *sensitive*;

their leaves, on being acted upon by so slight a stimulus as that of the touch of the finger, showing an instantaneous reaction, by either collapsing or folding: such as several Mimosæ, Smithia and Oxalis sensitiva, Averrhoa Carambola, Dionæa Muscipula, and the species of Drosera. But Hedysarum gyrans cannot be properly reckoned among these plants, the motion of its leaves being apparently not the consequence of an external stimulating cause: and the same may be said of those gradual and imperceptible approximations of the sexual organs in some vegetables, that have been enumerated as instances of irritability. Very striking instances of that principle may, however, be observed in the sexual, especially the male, organs of several plants*, such as Cactus Opuntia, most species of Cistus, Parnassia palustris, several genera of the natural order of the Rutaceæ, Berberis vulgaris, &c. It is the irritability of the stamens of the last-mentioned shrub which, though not unnoticed before, has given origin to an excellent paper of Smith†, and to another of Kölreuter, "Some further observations and experiments on the irritability of the stamens of the Barberry," communicated in the sixth volume of the *Nova Acta Academiæ Petropolitanæ*, about the same time when we were gratified with those of the president of the Linnean Society. Conceiving that this last-mentioned memoir, which makes part of a work not easily obtained, must be the more interesting to our readers, as it will enable them to compare the results of the experiments of two so distinguished observers, we do not hesitate to give a translation of it in this place.

---

* The last, but not the least remarkable instance of irritability in the sexual organs of plants, is that mentioned in vol. i. of our Annals, p. 294. as observed in the species of an undescribed New Holland genus, with which we understand Dr. Smith is to pay honour to the merits of M. Ventenat, in naming it after this capital botanist.

† First published in the *Philosophical Transactions*, vol. 78. p. 158. and reprinted in the same author's *Tracts relating to Natural History*, p. 165.

"It was about the beginning of May 1772, while busied in attending the singular property of the Barberry, by which the stamens are caused, on the application of a slight external stimulus, to spring forwards towards the pistil, that I discovered, both in respect of the structure and position of the stamens themselves, as well as in relation to that phænomenon, several circumstances till now entirely unknown, and such I trust as will be thought worthy to be communicated to the lovers of natural history. These discoveries are as follow, and seem to me to throw some light on this species of irritability in vegetables.

While the flower of the common Barberry* is still completely shut, but upon the point of expanding, the stamens form a somewhat acute angle with the pistil, assuming at the same time an oblique direction outwards; while their anthers are united among themselves, and the filaments insensible to all stimulus whatever.

Linnæus was mistaken when he attributed to the stamens two anthers; for they have but one, like those of the generality of vegetables, although their cells are indeed separated by a rather broader partition than common.

It should be remarked that these cells do not split open lengthways, with a fissure gradually dilating from the bottom upwards, as is commonly the case in the anthers of other plants, but that here the outer coat detaches itself along the edges of the partition which separates the two cells, and, raising itself up with the greater portion of the pollen adhering to the inner surface, finally faces towards the stigma: when perfectly opened they have the appearance of two ovate-round flattened laminæ, erected on the summit of the filament, having the inner surface that fronts the stigma covered with pollen. Just below them, on each side of that part of the filament which I have described as forming the partition between the cells, a small portion of the pollen will generally be found adhering. It is by this singular expedient that nature has so completely succeeded in her object of fecundation by the emission of pollen; for by this mode of opening of the anthers the stamens have gained so much in length, that, notwithstanding they perform their office with unusual celerity, they are enabled to reach with precision the stigma on which they are to discharge their contents: but if, on the other hand, the cells had opened in the more usual way, the stamens would have been too short for their intended functions.

---

* Berberis orientalis of Tournefort, which perhaps is nothing but a variety of our B. vulgaris, displayed to me in every respect the same phænomena.

If we remove from a flower, while yet entirely closed, its petals and calycine leaflets, carefully avoiding to injure the other parts, and leave it in this state attached to the stalk, the stamens are perceived gradually to extend and spread themselves out horizontally, assuming a position almost at a right angle with the pistil, where they begin to shed their pollen as above described. Presently afterwards they incline, and form a sort of flattened curve, the concave part of which is downwards. It is when they have taken this position that they begin to manifest their irritability, but in no very great degree; for when stimulated they erect themselves, and slowly approach the pistil, resuming the precise station they were found in before the petals were removed.

The stamens, in their natural and perfect state, are always as much extended as the petals, generally almost half closed, will admit of, while the anthers are placed under a kind of arch formed by the inflection of the upper edge of the petals. If in this state either their inner or outer surface be slightly stimulated with the point of some sharp instrument, a gentle but smart motion towards the stigma will instantly take place, while they are seen plainly to bend inwards, and apply their anthers, the inner sides of which are covered with pollen, either to the top of the stigma, which is a green knob, or perhaps in greater abundance against its projecting sides, which are of a different shade, and which after this operation are always found to have more or less of the pollen attached to them*.

As soon as a stamen has gone through this movement, it draws the petal to the base of which it is fixed a little towards itself; and this is the reason that, when we have suddenly stimulated all the stamens of a flower that was before pretty much expanded, we see it become about half closed again.

On whatever part we touch the filaments, they plainly evince their irritability; but I think that upon the whole I have found it to be greater the nearer I approached their base: as to the anthers, I have often handled them roughly, and even cut them off, without the least manifestation of motion or irritability ensuing, though this immediately became sensible when the filaments of these same stamens were stimulated lower down.

No sooner has the movement towards the pistil been completed, than the stamens begin to recede considerably, and extend themselves. If they are in great vigour, and their irritability wound up to a high pitch, this retrograde motion is very visible for a considerable distance; but presently becomes slower and slower, and less perceptible, until they finally repose, after having regained their original station, under the arch formed by the petals, which they often do in the space of a few minutes, though sometimes they employ in this passage a quarter of an hour, or even twenty minutes and upwards; but this depends chiefly upon the vigour of the plant and the temperature of the atmosphere. After they have reposed for a certain space of time, the stimulus may be again applied with the same effect as before, and even several times in a day, to the same flower. This is an experiment that I have very often repeated, and clearly established, and yet is in direct contradiction to the experiments of Messrs. Duhamel*, Adanson†, and Münchhausen‡; who pretend that the stamens neither return to their first station, nor can be made to repeat their movement. It is certain, however, as the last of these celebrated authors has asserted, that if the petals are gently and cautiously bent backwards, no motion whatever is produced in the stamens, not even if we take off the whole of the petals and calycine leaflets; and when it does happen during the experiment it is owing to want of due precaution in its performance, so that some part of the filament has been touched either by the instrument or by the petals. This may be easily made evident; for, if these two coverings of the stamens are properly removed, the filaments will proceed to perform their accustomed movement without the least delay, as soon as a stimulus is applied: but then, if the experiment be repeated, the ensuing motion is neither so brisk nor so perfect as it was the first time; an effect probably produced by the waste of juices in the flower by the operation of removing its petals and calycine leaflets, which may have deprived these organs of a portion of their strength.

---

* It is probable, as we find it also observed in Sprengel's *Entdecktes Geheimniss*, &c. that the projecting sides of the part described as stigma by Linnæus and others, are to be considered as exclusively performing the function of that organ: they are of a darker green than the rest of the knob, and exude moisture.—Ed.

If the stamen be smartly drawn back at the moment of its having been stimulated into action, while on its progress towards the pistil, it will again spring forward when released; but in such manner that it is evidently the effect of elasticity, and not an immediate consequence of the action caused by the stimulus first applied.

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* Traité des Arbres et des Arbustes, Partie i. p. 72.

† Familles des Plantes, tom. i. p. 59.

‡ Hausvater 3ter Theil Seite 440, and Duroi's Harbkesche wilde Baumzucht, Th. i. s. 77.

But if, on the other hand, we wait till they have, on their usual retreat, retired some distance from the pistil, we then see that, from the mere force of their irritable principle, which they have now had time to recover, they again spring forward on the application of a fresh stimulus; not indeed, as it appeared to me, with all the briskness that they show when they have been permitted to take their natural and complete repose, and have restored themselves entirely.

The corolla itself may be pretty roughly handled without causing any motion in the stamens, even though these should be predisposed to it. If you blow with some degree of force into the flower, its stamens will still remain inert; but if this is done more violently, they then spring vigorously forward to their duty. A drop of water introduced among them has no perceptible effect.

In all possible cases and circumstances the stamens exercise this their inherent power in the same direction, and that is uniformly and constantly towards the pistil.

This irritable principle is preserved even after they have been deprived of their anthers; nor is it destroyed by the removal of the stigma, nor even of the entire pistil.

It is remarkable, however, that if we excite them, for instance, with the point of a needle, and at the same time prevent all possibility of their stirring, they will be found to continue completely motionless, even though we set them free the next instant. This to me is the most conclusive argument of this movement not being the effect of elasticity, but that it originates from some certain vital power, the action of which, however, is so weak and transitory, that its duration is not many seconds, and is completely impeded by the least counteraction.

When exposed to the sun in the focus of a common burning-glass, they are set in motion, just as when stimulated by a body; and, if they have received no injury by it, retire in their usual manner, and may be again stimulated with effect by any other means. The same will be found to take place after they have been deprived of the covering of the petals and calycine leaflets.

Sometimes, especially when their powers have been somewhat exhausted, or the stimulus has not been sufficiently great, they are not made to move for some minutes after irritation.

When the flowers are electrified, and sparks are drawn from them by the approach of a metallic body, the stamens immediately spring towards the pistil. The same thing happens when we hold a pointed metal needle near either their inner or outer surface; for the effect of the needle is to afford a freer and more gentle issue to the electric fluid. This phænomenon is also observed when we throw a few sparks even on a nonelectrified flower, by the means of the jar or needle. But, on the other hand, if the flowers, not being electrified, are placed on a metal stand, and are then held near a jar that has been previously strongly charged by the machine, the stamens are not set in motion even by a smart shock; the reason of which probably is, that the electric fluid is more readily attracted by the metallic than by the vegetable body. If the electric fluid is made to pass into the metallic stand immediately through a bunch of these flowers, only a faint dumb kind of explosion will be perceived, and not the least motion caused among the stamens.

These stamens are never, except when acted upon by some adventitious stimulus, excited into motion; so that, if it could happen that during the season of their bloom the flowers were to be deprived of such exciting cause, the stamens would continue extended at their wonted distance from the pistil, and no fecundation could take place. But now let us see the means adopted by Divine Wisdom to ensure, by a certain never-failing agency, the setting in motion these organs, and the consequent fecundation of this very useful vegetable. The whole mystery is revealed in the peculiar structure of the flowers themselves, and by their being an article of the first necessity to another part of the creation, who are also entitled to a share of the sum of good of this world.

Each petal has near its base two oblong melliferous glands of a reddish-yellow colour and convex form, converging at their bases, but diverging upwards. Between every two of these glands a stamen is placed, which in its perfect and natural state is so set that the lower part of it exactly fills up the interval between them, leaving the glands themselves quite exposed: so that, whenever an insect (of which abundance present themselves in the course of a day) attempts to come at and extract the honey exuded by the glands, if the flower be in a proper state, it is impossible for it to avoid touching the filament that is in the way, and especially the lower part which is by far the most irritable, either with the proboscis or some other part of the body, while exerting itself to obtain its food; upon which this organ instantaneously springs up, and proceeds to cover with its prolific dust the upper part of the pistil.

The insects that frequent these flowers are of various genera and species; but I have more particularly observed that beetles of various sizes, as well as flies of different kinds, besides bees and wasps, are the greatest frequenters of them; and have often admired the motion of the stamens rapidly succeeding each other, and the consequent fertilizing work carried on by the zeal and ardour of these little beings, who, while seeking their own food, were at the same time as successfully employed in fulfilling the intentions of nature in another department.

Thus has Nature selected for her agents in the work of impregnating and propagating this our useful and native shrub, those very little beings that have been so often regarded by the superficial observer as useless. And thus, while these little animals are revelling in the abundance of their favourite viands, they not only find their own gratification in the pursuit, but are at the same instant providing nourishment for their successive broods, as well as for many other beings not yet called forth into existence. And we have here found one more, and a till now unexplored proof, not only of the intimacy, but also of the necessity of a connection of the animal and vegetable part of the creation in the economy of nature."

II. *Supplementary Remarks on Professor* WILLDENOW's *new Edition of* LINNÆUS's *Species Plantarum. Berlin,* 1797—1800. *By Dr.* ROTH.

[Concluded from vol. i. page 320.]

61.

THE leaves of PRIMULA *longiflora* Spec. Plant. tom. 1. p. 803. are, as well as those of Primula farinosa, powdered at the lower surface, which circumstance ought not to be omitted in the differentia specifica: P. *longiflora* foliis serratis glabris, subtus farinaceis, umbella nutante, corollæ tubo longissimo.

62.

ANAGALLIS *Monelli* is mentioned by Linnæus as a perennial plant, though it is certainly annual. This species is distinct from all its congeners by its lanceolate leaves and upright stem. I am not acquainted with any species of Anagallis that has divided leaves, and hence do not know why the leaves of this species are called *indivisi*. Mr. Schousboe discovered a new species; whence it has been found necessary to alter the specific character of A. Monelli.

1. **Anagallis** *Monelli.*—A. foliis lanceolatis, caule erecto herbaceo. *Schousb. Marocco, pars* 1. *p.* 78.

A. foliis indivisis, caule erecto. *Spec. Plant. tom.* 1. *p.* 822. *Poiret Iter ii. p.* 121.—*Desfont. Atlant.* 1. *p.* 169.

Habitat in Italiæ et provinciæ Hahæ agris. ⊙.

2. **Anagallis** *collina*: A. foliis lanceolatis, caule diffuso basi lignoso. *Schousb. Marocco, pars* 1. *p.* 78.

Hab. in aridis collibus provinciæ Hahæ. ♄.

Differt ab antecedente, cui similis, caule basi fruticoso, ramosissimo, crassitie pennæ corvinæ; ramis undique diffusis; foliis interdum margine replicato-undulatis.

63.

The generic character which Linnæus gives of CONVOLVULUS runs thus: *Corolla* campanulata, plicata. *Stigmata* duo. *Capsula* bilocularis: loculis dispermis; and that of IPOMŒA: *Corolla* infundibuliformis. *Stigma* capitato-globosum. *Capsula* trilocularis. But in Ipomœa the corolla is plaited as well as in Convolvulus, and the bell-shape in the latter is confined to a few species only, gradually passing into that of a funnel, and this so insensibly that no limits can be drawn; a circumstance which every one may observe on comparing several of its species. The number and division of the stigmas is as liable to variation as the number of stamens: it is only their form on which we can rely for constant characters. The fruit varies as much in the number of cells, as in that of the seeds in each cell: sometimes a cell vanishes completely, when the ovulum contained in it is left unimpregnated; and in cases where a cell contains several ovula, not unfrequently only one of them is impregnated, while the others are abortive. It is only the nature of the integuments of the seeds which is not liable to vary. Thus we find but two parts that can afford constant characters for distinguishing these two genera; which are, the form of the stigma, and the nature of the integuments of the seeds.—Convolvulus and Ipomœa should either be united into one genus, or greater attention be paid in the distribution of the species to the more essential characters of both genera, than has been done by Linnæus and the editors of his works. Gærtner, who was also aware of the difficulty to keep these two genera distinct, derived the essential characters from the integuments of the seeds; but as this is rather too abstruse for the beginner in botany, I think it more convenient to substitute for it the difference in the stigma. Linnæus himself adopted this character, ascribing to Ipomœa a capitate stigma; but in the distribution of the species he neglected it, referring several species to Convolvulus that have a stigma completely capitate.—Convolvulus has *Stigmata duo oblonga;* Ipomœa, on the other hand, a *stigma simplex* (*rarius bifidum*) *capitatum;* whence Convolvulus tridentatus, Nil, purpureus, striatus, speciosus *Spec. Plant. tom.* 1. *p.* 848. *seq.* and some others furnished with a capitate stigma, should be referred to Ipomœa.

64.

Between Convolvulus pentapetaloides and lineatus Spec. Pl. tom. 1. p. 867. should come in

CONVOLVULUS *ciliatus:* C. foliis oblongis cuneiformibus obtusis emarginatis ciliatis, caule prostrato, capsulis pilosissimis. *Roth Catal. Bot. fasc.* 2. *p.* 22.

Recedit a *Convolv. pentapetaloide*, cui proximus, 1. Foliis cuneiformibus, obtusis, ciliatis exceptis floralibus, emarginatis. 2. Pedunculis brevissimis. 3. Capsula pilosa.

65.

Between Ipomœa hederacea and triloba Sp. Pl. tom. 1. p. 881.

p. 884. insert, together with Convolvulus speciosus, striatus, Nil and purpureus,

1. IPOMŒA *barbata.*—I. foliis cordatis trilobis, pedunculis subunifloris retortis, calycibus barbatis: foliolis bracteisque revoluto-patentibus. *Roth Cat. Bot. fasc.* 1. *p.* 37.—Conv. cœrulescens, &c. *Dill. Hort. Elth. t.* 80. *f.* 92.

Differt ab Ipomœa Nil (Convolvulo Linn.), cum qua eam conjungere videtur Linnæus ob synonymum Dillenii, 1. Foliorum sinubus rotundatis; nec rectangulis. 2. Pedunculis floriferis retortis; nec erectis. 3. Calyce infra medium pilis rufis maxime barbato, supra medium cum bracteis recurvato-patentissimo; nec recto, stricto, connivente. 4. Corollæ laciniis rotundatis et obsolete emarginatis; nec triangularibus.

2. IPOMŒA *varia.*—I. foliis cordatis integris trilobis quinquelobisve, pedunculis unifloris erectis, calycibus apice patulis: foliolis dorso barbatis; tribus exterioribus cordato-lanceolatis, radice fusiformi. *Roth Catal. Bot. fasc.* 2. *p.* 17.—Convolvuloides pilosa. *Mœnch Method. p.* 452.

Differt ab antecedente 1. Radice fusiformi perenni. 2. Foliorum figura varia. 3. Pedunculis multo longioribus. 4. Bracteis ad semiunciam a calyce remotis; nec illi adpositis. 5. Calyce triangulo; nec tereti. 6. Foliolis calycis dorso tantum pilosis; tribus exterioribus cordato-lanceolatis.

66.

Between Trachelium cœruleum and tenuifolium Spec. Pl. tom. 1. p. 926. 927. insert

TRACHELIUM *angustifolium.*—T. foliis linearibus sessilibus integerrimis glabris. *Schousboe Marocco, pars* 1. *p.* 85.

Hab. in montosis aridis inter Mequenesiam et Fezzan.

67.

Next to Lonicera japonica Spec. Pl. tom. 1. p. 985. insert:

LONICERA *canescens.*—L. pedunculis bifloris, baccis distinctis,

stinctis, caule volubili, foliis cordato-ovatis petiolatis. *Schousb. Marocco, pars* 1. *p.* 88.—L. biflora *Desf. Atl.* 1. *p.* 184. *t.* 52.—Hab. in sepibus ad Mogadore ♄.

68.

Between Datura Metel and lævis Sp. Pl. tom. 1. p. 1009. is to come in

Datura *macrocaulos.*—D. pericarpiis glabris inermibus nutantibus, foliis oblongis repandis subtus sericeis, caule herbaceo inferne piloso superne glabro subinflato.

Hab. in Cuba. Wiborg. ⊙.

This beautiful plant I owe to the kindness of Professor Viborg of Copenhagen, who communicated to me seeds of it under the name of *Datura macrocaulos* Ortegii*.

69.

Whether *Atropa plicata* Roth Cat. Bot. fasc. 2. p. 24. be, as I suspect, a different species from *A. procumbens* Sp. Pl. tom. 1. p. 1018., must be left to the decision of those botanists that have an opportunity to examine both the plants, or to compare the figure of Cavanilles (Icon. vol. 1. t. 72.) with specimens of mine. As for the following species, it is obviously distinct both from Atropa plicata and procumbens:

Atropa *umbellata.*—A. caule erecto herbaceo hirto, umbellis axillaribus pedunculatis cernuis, calycibus corollisque subplicatis, filamentis basi barbatis, foliis ovatis integerrimis scabris; floralibus geminis. *Roth Cat. Bot. fasc.* 2. *p.* 26.

70.

Atropa *solanacea* Sp. Pl. tom. 1. p. 1018.

There is in the royal garden of Herrenhausen, under the name of *Atropa solanacea*, a shrub which, on account of the nature of its anthers, that are oblong, cohering, and opening with a double aperture at their tops, is obviously a Solanum, not an Atropa. It appears to agree completely, as far as we can learn from this distinctive characters, with Jacquin's *Solanum aggregatum* (Icon. rar. tab. 323. Collect. 4. p. 124.), and with Commelin's *Solanum* lignosum africanum sempervirens, laurinis foliis. *Hort. Amst. vol.* 2. *t.* 96. If, therefore, Atropa solanacea L., as I conceive, really belong to the genus Atropa, the shrub alluded to must be separated from it, and referred with the above-mentioned synonyms to the genus Solanum.

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* This is no doubt *Datura ceratocaula* of Ortega, described by him in his *Decas prima*, &c. p. 11. This botanist's description agrees exactly with that given by Dr. Roth, whence we have omitted the latter.—Ed.

71.

After Lobelia stricta Sp. Pl. tom. 1. p. 944. insert

LOBELIA *pallida*.—L. caule erecto simplici anguloso, foliis oblongo-ovalibus denticulatis undulatis incano-pubescentibus, racemo terminali simplici.—L. pallida *Sprengel. Hort. Bot. Hallens. p.* 56.—Hab. in America septentrionali. ♃. Sprengel.

Radix perennis.—Caulis erectus, strictus, simplex, crassitie pennæ corvinæ, angulosus, ad angulos scabriusculus, bi- s. tripedalis, intra racemum lævis, annuus, sæpius tortus.—Folia læte viridia, incano-pubescentia, scabriuscula, subtus pallidiora, subcarnosa, rigidiuscula, obtusa, margine denticulata, dentibus obsoletis : radicalia ovalia, in orbem disposita, terræ incumbentia, margine planiuscula, uncias tres circiter longa et in medio vix ultra unciam lata, basin versus angustiora : caulina alterna, remota, sessilia, linea elevata scabriuscula ad caulem utrinque decurrentia, utrinque angustata, margine undulata, sensim magnitudine decrescentia : inferiora oblongo-ovalia ; superiora oblonga ; suprema et floralia linearia.

Racemus terminalis, simplex, semipedalis et pedalis, multiflorus, laxus, speciosus.—Flores alterni, solitarii, pal-

lide cœrulei, pedunculati.—Pedunculi filiformes, obsolete trigoni, semiunciam circiter longi, basi foliolo suffulti.

Calyx monophyllus, glaber, pentagonus, sulcis decem notatus: dentibus subæqualibus, linearibus, acutis, integerrimis, rectis, sesquilineam ad duas lineas longis, dorso linea elevata costatis: floris hemisphæricus: fructus ovato-subrotundus, subinflatus.—Corolla monopetala, irregularis.—Tubus cylindraceus, calyce duplo fere longior, obsolete pentagonus, superne longitudinaliter divisus, ore plicatus. Limbus quinquepartitus; laciniis duabus superioribus minoribus, sesquilineam ad duas lineas longis, linearibus, obtusis, adscendentibus, æqualibus; tribus inferioribus majoribus, subæqualibus, rectis, ovalibus, obtusis, dorso linea elevata costatis, duas ad tres lineas longis, intermedia vix paulo longiore lateralibus, basi ad faucem utrinque callo elevato albo notatis.—Stamina quinque.—Filamenta subulata, subcompressa, tubo corollæ breviora, infra medium alba, distincta, pilosa, supra medium cœrulescentia, glabra, conniventia, apice connata, flavescentia.—Antheræ nigricantes, cohærentes et quasi cylindrum constituentes, tamen divisibiles, extus striatæ.—Pistillum: Germen inferum acuminatum: Stylus cylindraceus, longitudine filamentorum: Stigma rotatum, obtusum, margine fimbriatum.

Capsula calyce tecta, ovata; longitudinaliter sulcata, bilocularis, apice bidentata, bivalvis.—Semina exigua, oblonga, brunnea, transversim rugosa.

72.

SOLANUM *Melongena* Sp. Pl. tom. 1. p. 1036. The synonym of Plukenet, Phyt. tab. 226. f. 2., does not appear to belong to it, the leaves being represented there as *angulato-dentata*, and the fruit as *clavato-incurvus*.

73. DIOSMA

73.

Diosma *oppositifolia* Spec. Pl. tom. 1. p. 1133. The synonym of Plukenet given there should be *Alm. tab.* 279. instead of 273.

74.

Mr. Schousboe had an opportunity at Morocco to subject *Elæodendron Argan* to a more minute examination, and to rectify the synonymy as follows:

Elæodendron *Argan*.—E. ramis spinosis, foliis lanceolatis obtusis. *Schousb. Maroc. P.* 1. *p.* 103.

E. ramis spinosis, foliis ovatis obtusis. *Retz. Obs. Bot. fasc.* 6. *p.* 26. *Linn. Sp. Pl. tom.* 1. *p.* 1148. (*exclusis synonymis Jacquini et Boccones.*)—Rhamnus siculus *Linn. Syst. Nat.* 3. *p.* 227. (*exclusis synonymis.*)—Lycii similis frutex indicus *Comm. Hort. Amst.* 1. *p.* 161. *t.* 83.

75.

In the second division, ** *Caulescentes*, of Viola, after V. decumbens *Sp. Pl. tom.* 1. *p.* 1168. a new species is to come in, first discovered by Don C. G. Ortega, and communicated to me by Prof. Wiborg.

Viola *verticillata*.—V. caule debili diffuso pubescente, foliis senis verticillatis inæqualibus oblongo-lanceolatis serrulatis, pedunculis oppositis axillaribus, calycibus postice æqualibus.—Hab. in Nova Hispania ♃. Ortega.

76.

After Illecebrum alsinefolium Spec. Pl. tom. 1. p. 1209. a plant is to come in, discovered by Mr. Schousboe, and deviating from the generic character of Illecebrum in having five small petals, and a trivalved capsule, while the corolla in Illecebrum is wanting, and its capsule has five valves. No essential difference appearing in the rest of the floral parts, Mr. Schousboe has not separated it from that genus; but in order to direct the attention of the future observer to the marks that distinguish it at once from all its congeners, I take the liberty to substitute another specific character for that given by my friend :

Illecebrum *gnaphaloides*.—I. caule suffruticoso prostrato, foliis oblongis tomentosis, floribus terminalibus congestis corollatis, capsula trivalvi.

I. caule suffruticoso, prostrato, foliis oblongis, tomentosis, floribus terminalibus, congestis. *Schousb. Maroc. P.* 1. *p.* 117.—Hab. in arenosis maritimis prope Mogadore ♄.

77.

Pollich's synonym of Thesium alpinum Sp. Pl. 1. p. 1212. is to be cancelled, as the plant meant by that botanist is different both from T. alpinum and Linophyllum. This observation was first made by Mr. Hayne on discovering a new species near Berlin, which he compared with the rest. The specific characters of the two Linnean species therefore should be altered :

1. **Thesium** *Linophyllum*.—T. caule erecto subramoso, panicula foliacea, floribus paniculatis, bracteis minoribus obvallatis. *Hayne in Schrad. Journ. vol.* 1. *no.* 1. *p.* 28. *t.* 6. *c.*—T. Linophyllum *Spec. Plant.* (*cum synonymis et varietatibus.*)
2. **Thesium** *ramosum*.—T. caule erecto ramoso, racemis foliatis elongatis, floribus sessilibus bracteis minoribus obvallatis. *Hayne loc. cit. p.* 30. *t.* 7.—T. palatinum *Roth Cat. Bot. fasc.* 2. *p.* 29. *n.* 2.—T. alpinum *Pollich Palat. n.* 240.—Habitat in Palatinatu.
3. **Thesium** *alpinum*.—T. caulibus prostratis simplicibus, racemo foliato secundo, floribus sessilibus bracteis minoribus obvallatis. *Hayne loc. cit. p.* 32. *t.* 7. *D.—Roth Catalecta Bot. fasc.* 2. *p.* 29. *n.* 1.—*Spec. Pl.* (*excluso synonymo Pollichii.*)
4. **Thesium** *ebracteatum*.—T. caule erecto simplici, racemo foliato, floribus pedicellatis, bracteis minoribus destitutis.

Hayne l. c. p. 33. *t.* 7. *Termini Botan. no.* 6. *t.* 26. *f.* 4. —T. comosum *Roth Cat. Bot. fasc.* 2. *p.* 29. *n.* 3.—Habitat prope Berolinum ♃.

78.

CHENOPODIUM *anthelminticum* Sp. Pl. tom. 1. p. 1304. —Linnæus gave as synonyms to this plant: Chenopodium Lycopi folio perenne. *Dillen. Hort. Elth. p.* 78. *t.* 66. *fig.* 76 *et* 77.; but neither of these figures can belong to it. Fig. 76 is obviously Chenopodium ambrosioides Spec. Pl. l. c. n. 15., erroneously mentioned by Linnæus as an annual, though it is perennial, at least in our latitude. Fig. 77, on the other hand, is a good representation of Chenop. multifidum Sp. Pl. l. c. n. 16, to which the synonym should be referred.

79.

SALSOLA *hyssopifolia* Spec. Pl. tom. 1. p. 1314. This species differs from its congeners by having a monophyllous five-cleft calyx, furnished on the inner side with five inflected teeth; these, after fructification, close the germen; and the five outer laciniæ, that before were scarcely perceptible, increase into five lanceolate, horny, uncinated bodies, as is very well represented by Pallas in his Travels through the Russian Empire, tab. L. fig. 1. lit. *a—f*. It has moreover a simple short style, two long stigmas, and seed simply curved inward. These characters are sufficient to separate this plant from the Salsolæ, having a *semen cochleatum* and a five-cleft calyx, but destitute of teeth that close the mouth. In *Schrader's Journ. fur die Bot. vol.* 2. *n.* 2. *p.* 303—328, I have described a similar plant as a new genus under the name of *Kochia*, to which also Salsola hyssopifolia is to be referred, together with another species, which I shall here communicate. This new genus belongs to Pentandria-Monogynia, between Celosia and Chenolea.

KOCHIA.

Calyx monophyllus, campanulatus, quinquefidus: laciniis demum alienatis, rotatis: faux clausa dentibus quinque triangularibus depressis. Corolla nulla. Stylus brevis. Stigmata 2 seu 3 longa. Capsula unilocularis, 1—2-sperma. Semen incurvum.

1. KOCHIA *arenaria*.—K. caule diffuso, foliis linearibus, laciniis calycis fructiferi demum membranaceis scariosis venosis ovato-oblongis obtusis. *Roth in Schrad. Journ. vol.* 2. *n.* 2. *p.* 307. *t.* 2. (*ubi descriptio.*)—Camphorosma monspeliaca *Pollich Palat. n.* 176.—Salsola arenaria *Flora Germ. tom.* 2. *P.* 2. *Add. p.* 575.—Willemetia arenaria *Märklin in Schrad. Journ. vol.* 2. *n.* 2. *p.* 330.—Habitat in Palatinatu ⊙.

Laciniæ calycis ante anthesin exiguæ, lanceolatæ dentiformes, post anthesin increscunt in alas quinque rotatas, ovato-oblongas vel rhomboideas, obtusas, membranaceas, scariosas, albidas, hyalinas, venis purpureis parum elevatis pulcherrime pictas, petala mentientes.—Semen arcuatum subrotundum.

2. KOCHIA *hyssopifolia*.—K. caule erecto, foliis linearibus, laciniis calycis fructiferi demum lanceolatis subulatis corneis, apice uncinatis.—Salsola hyssopifolia *Spec. Plant. tom.* 1. *p.* 1314.—*Pallas Iter.* 1. *Append. n.* 107. *tab. L. f.* 1.—Willemetia lanata *Märklin loco cit. p.* 330. (*excluso synonymo.*)—Habitat in Sibiria ⊙.

Calycis laciniæ exiguæ, dentiformes, lana florum glomerulum obducente absconditæ, post anthesin increscunt in dentes expansos, rotatos, ultra lineam longos, anguste lanceolatos, subulatos, apice incurvos et uncinatos, e tereti subcompressos, nitidos, rigidos, corneos, flavescentes.—Stylus brevis cum stigmatibus duebus purpureis. Semen arcuatum, subrotundum.

3. KOCHIA *atriplicifolia*.—K. caule erecto, foliis oblongis sinuato-dentatis, laciniis calycis fructiferi demum mem-

branaceis erosis brevibus.—Salsola atriplicifolia *Sprengel Hort. Bot. Hall. ii. p.* 35. *n.* 46.—Habitat in Persia ⊙. Sprengel.

Caulis pedalis et ultra, erectus, subramosus, glaber.—Folia alterna, glabra, oblonga, petiolata, utrinque attenuata, sinuato-dentata.—Panicula terminalis, ramosa, foliosa.—Flores exigui, nudi, glabri.—Calycis laciniæ ante anthesin minutæ, lente tamen observabiles, obtusissimæ, in dorso dentium quinque inflexorum in formam squamulæ perexiguæ conspicuæ; post anthesin magis increscentes in squamas membranaceas, albidas, erosas, patulas: dentes quinque calycem claudentes, depressi, triangulares, dorso gibbi, virides, subcarnosi.—Germen depressum. Stylus brevis crassiusculus. Stigmata plerumque tria, albida.—Semen reniformi-orbiculatum, compressum, nigrum, nitidum.

80.

Between Salsola fruticosa and indica Sp. Pl. tom. 1. p. 1316. insert

SALSOLA *verticillata*.—S. fruticosa, erecta, foliis oppositis linearibus semicylindricis, floribus subverticillatis.—*Schousb. Maroc. P.* 1. *p.* 123.—Habitat ad Mogadore ♄. Frutex glaberrimus, ramosus, erectus, tripedalis.

81.

ERYNGIUM *campestre* Sp. Pl. tom. 1. p. 1358.—Mr. Schousboe has directed our attention to an error that has been committed by Linnæus and other botanists. They point out, in the specific character of that plant, folia radicalia amplexicaulia pinnato-lanceolata. But this can only be said of the stalk-leaves: the root-leaves are ternate, of which I have lately satisfied myself by examining a perfect specimen found in the neighbourhood of Halle. Hence Mr. Schousboe is right in altering the specific difference as follows:

Eryngium *campestre*.—E. foliis radicalibus ternatis petiolatis: foliolis decurrentibus, petiolis triquetris. *Schousb. Maroc. P.* 1. *p.* 125.

Folia radicalia petiolata, ternata: foliolis ovato-oblongis, sinuato-dentatis, spinosis: lateralibus decurrentibus membrana alata: terminali trifido. Petiolus triqueter, longitudine folii.—Folia caulina inferiora petiolata, pinnata: foliolis quinque decurrentibus, figura et structura radicalium. Petiolus omnino teres, striatus longitudine folii.—Folia caulina superiora terna, vel quinato-pinnata, foliolis forma reliquorum, licet minoribus. Petiolus folio brevior, planiusculus, e foliolis decurrentibus alatus, ad basin auriculatus, amplexicaulis.

Obs. When the stalk is completely developed, the root-leaves and the lower stalk-leaves are mostly fallen off, or at least less perceptible.

82.

In the synonym of Plukenet to Athamanta *Libanotis* Spec. Pl. tom. 1. p. 1400. it should be tab. 173. instead of tab. 137.

83.

Between Cachrys Libanotis and Morisoni Sp. Pl. tom. 1. p. 1409. should come in

Cachrys *humilis*.—C. foliis supradecompositis glabris: foliolis linearibus trifidis mucronatis, seminibus glabriusculis. *Schousb. Maroc. P.* 1. *p.* 133.—Habitat prope Cap. Spartel ♂ ?

84.

Between Œnanthe peucedanifolia and pimpinelloides Sp. Pl. t. 1. p. 1442. should come in

Œnanthe *nodiflora*.—Œ. caule prostrato, foliis bipinnatis planis, umbellis lateralibus sessilibus, fructu sulcato scabro. *Schousb. Maroc. P.* 1. *p.* 135.—Habitat prope Mogadore ⊙.

After

85.

After Pimpinella peregrina Sp. Pl. tom. 1. p. 1473. is to follow

PIMPINELLA *villosa.*—P. foliis radicalibus, bipinnatis: foliolis crenatis, basi cuneatis, petalis seminibusque villosis. *Schousb. Maroc. P.* 1. *p.* 139.—Habitat in arenosis regionis Tingitanæ ♃.

86.

Between Rhus incisum and tomentosum Sp. Pl. tom. 1. p. 1483. insert

RHUS *albidum.*—R. foliis ternatis: foliolis sessilibus cuneiformibus crenatis utrinque cano-tomentosis; petiolis marginatis. *Schousb. Maroc. P.* 1. *p.* 143.—Habitat in collibus arenosis ad Mogadore ♄.

Cultura in horto botanico Hafniensi canitiem et tomentum exuit foliaque fere glabra et magis crenata evaserunt, quam in spontanea planta.

87.

After Linum gallicum Sp. Plant. tom. 1. p. 1537. add

LINUM *virgatum.*—L. calycibus lineari-subulatis acutis, foliis lineari-lanceolatis alternis, caule ramoso virgato. *Schousb. Maroc. P.* 1. *p.* 151.—Habitat ad margines agrorum in sylvis provinciæ Hahæ. ⊙ ?

Corolla lutea, magnitudine Lini usitatissimi.

88.

Under DROSERA *longifolia* Sp. Pl. tom. 1. p. 1544. two distinct species have hitherto been hid, which Mr. Hayne has determined (see his observations in my Catalecta Bot. fasc. 2. p. 30 and 31.). One of them he called Drosera intermedia, and this is the real D. longifolia of Linnæus, according to his herbarium, as I see from a specimen sent me by Mr. Dawson Turner. The Drosera longifolia of some German writers is D. anglica of the English botanists.

According to the specific character given by Linnæus to his plant, it would appear as if the last-mentioned species was meant by him, for he characterizes the leaves as *ovali-oblonga*. At all events the specific difference as given by Linnæus is to be altered, and the synonymy to be amended.

1. DROSERA *longifolia*.—D. scapis radicatis adscendentibus, foliis ovalibus, stigmatibus emarginatis.

D. longifolia *Sp. Pl. tom.* 1. *p.* 1544. (*exclusis synonymis Pollichii et Roth*) *Schkuhr's Manual, vol.* 1. *p.* 259. *tab.* 83.—*Smith Fl. Brit. vol.* 1. *p.* 347.—D. intermedia *Dreves & Hayne Bot. Bilderb. vol.* 3. *no.* 1. *p.* 18. *pl.* 3. *f.* B.—*Roth Catal. fasc.* 2. *p.* 30.

Scapus basi declinatus, adscendens, foliis non, vel parum tantum, longior.—Folia ovalia s. obovata.—Stigmata emarginata, dentata.—Semina obovata, glandulis elevatis obsessa, arillo destituta.

2. DROSERA *anglica*.—D. scapis radicatis erectis, foliis obverse lanceolatis, stigmatibus clavatis.

D. anglica *Smith Fl. Brit. vol.* 1. *p.* 347.—*Huds. Fl. Angl. ed.* 2. *p.* 135.—D. longifolia *Roth Fl. Germ. vol.* 1. *p.* 140. *vol.* 2. *P.* 1. *p.* 373. (*exclusis synon. Linnæi, Halleri, Bergii & Bœhmeri*).—*Dreves & Hayne Bot. Bilderb. vol.* 3. *no.* 1. *p.* 13. *pl.* 3. *f.* A.—*Roth Cat. Bot. fasc.* 2. *p.* 31.

Scapus erectus, strictus, foliis duplo vel triplo longior.—Folia obverse lanceolata, in petiolum decurrentia, ultra uncialia.—Stigmata clavata.—Semina ovata, arillo membranaceo reticulatim venoso tecta.

OBS. In Droseris germanicis simile phænomenon observatur et non minus miraculosum quam in *Dionæa Muscipula*. Foliorum scilicet pili apice roriferi ab insecto irritati inflectuntur; inflexi insectum incarcerant et folium demum complicatum incarceratum tenet. Conf. *Roth Beiträge zur Botanik, vol.* 1. *p.* 60. *Ræmer und Usteri Mag. für die Bot. no.* 2. *p.* 27.

89.

Leucojum autumnale Spec. Pl. tom. 2. p. 30. according to the observations of Mr. Schousboe, has never a *spatha multiflora*, but *biflora*; and as this botanist has discovered a new species nearly akin to this, the Linnean specific character must be amended.

1. LEUCOJUM *autumnale.*—L. spatha monophylla biflora, petalis ovatis, apice tridentatis, stylo filiformi. *Schousb. Mar. P.* 1. *p.* 153.—*Spec. Pl.* 2. *p.* 30.—*Desf. Fl. Atl.* 1. *p.* 281.—*Poiret Iter.* 2. *p.* 144.

Spatha monophylla, biflora, rarius uniflora.—Petala ovato-oblonga, dorso nervosa, apice tridentata: dente intermedio crassiore magis producto.—Pistillum corolla duplo brevius.

2. LEUCOJUM *trichophyllum.*—L. spatha diphylla biflora, petalis lanceolatis acutis, stylo filiformi. *Schousb. Mar. P.* 1. *p.* 154.

Habitat in campis apricis regionis Tingitanæ ♃.

Differt ab antecedente, 1. Flore paulo majore. 2. Spatha diphylla: foliolis oppositis, æqualibus, lineari-lanceolatis, acutis, nervosis. 3. Petalis lineari-lanceolatis, octonerviis, acutis; nec tridentatis. 4. Pistillo corolla quadruplo breviore.

90.

Between Narcissus Pseudo-Narcissus and minor, Sp. Pl. tom. 2. p. 36. insert

NARCISSUS *cernuus:* N. spatha uniflora: nectario cylindraceo crispo sexfido, petalis ovalibus obliquis longiore, flore cernuo. *Roth Cat. Bot. fasc.* 1. *p.* 43.

A *Narcisso minori* recedit, 1. Flore triplo saltem majore, albido. 2. Petalis obliquis, oblongo-ovalibus. 3. Nectario cylindraceo, petalis longiore.—A *Narcisso moschato* differt, nectario ore sexfido, undulato, crispo; nec ore obsolete repando, nec undulato aut crispo.

91. NAR-

91.

Narcissus *odorus* Sp. Pl. tom. 2. p. 38.—Linnæus gives to this plant the synonym of *Narcissus odorus Gouan*, which, however, is so different from the other, that it must constitute a distinct species:

Narcissus *Gouani:* N. scapo ancipiti unifloro, nectario campanulato sexfido crenulato plicato, petalis duplo breviore, foliis planis. *Roth Nov. Pl. Spec. in Rœm. Archiv. für die Bot. no.* 3. *p.* 39.—*Cat. Bot. fasc.* 2. *p.* 32.—*Gouan Illustr. p.* 23. *n.* 4.—Habitat in Europa australi ♃.

92.

I have reason to believe that *Narcissus serotinus* Schousboe Marocc. Pars 1. p. 155., and the same of Linn. Spec. Pl. tom. 2. p. 41. are two distinct species, though Mr. Schousboe considers them as the same. The number of flowers, and the form of the nectary, appear both to be very different from those of the other, as will be found by such botanists as have the opportunity of comparing them. But Mr. Schousboe has discovered another new species, which he kindly communicated to me, namely

Narcissus *viridiflorus:* N. spatha multiflora, nectario campanulato brevissimo, petalis linearibus, foliis teretibus fistulosis. *Schousb. Maroc. P.* 1. *p.* 157. *tab.* 2.—Habitat juxta Tingidem et inter Gibraltariam et St. Rocque ♃.

93.

Between Amaryllis lutea and pumilio Sp. Pl. tom. 2. p. 50. belongs

Amaryllis *exigua:* A. spatha monophylla uniflora acuta, corolla campanulata erecta æquali, staminibus erectis æqualibus. *Schousb. Maroc. P.* 1. *p.* 160.—Habitat in regione Tingitana ♃.

Folia lineari-filiformia. Corolla lutea, basi in tubum brevem angustata.

94. After

94.

After Allium pedemontanum Sp. Pl. tom. 2. p. 77. comes in

Allium *cernuum:* A. scapo nudo tetragono umbellifero, foliis linearibus planiusculis, umbella cernua, staminibus simplicibus, germine sexdentato. *Roth Nov. Pl. Sp. in Rœmeri Archiv. &c. no.* 3. *p.* 40.—*Cat. Botan. fasc.* 2. *p.* 33. *tab.* 2.—Habitat ...... ♃.

Umbella cernua primo intuitu a congeneribus discernitur.

95.

Allium clusianum Sp. Pl. tom. 2. p. 79.—To this belongs

Allium *niveum:* A. scapo nudo teretiusculo umbellifero, foliis linearibus planis ciliatis, seminibus simplicibus. *Roth Cat. Bot. fasc.* 2. *p.* 35.—Allium ciliatum *Roth Nov. Gen. Plant. in Rœmeri Archiv. für die Bot. no.* 3. *p.* 41.

96.

Between Scilla maritima and Lilio-Hyacinthus Sp. Pl. tom. 2. p. 125, 126. insert

Scilla *serotina:* S. nudiflora, bracteis patentibus, scapo subsquamoso. *Schousb. Maroc. P.* 1. *p.* 165.—Habitat juxta Saffy ♃.

97.

After Scilla campanulata Sp. Pl. tom. 2. p. 128. may come

1. **Scilla** *mauritanica:* S. floribus racemosis, bracteis binis pedunculum æquantibus, foliis linearibus planis, apice involutis. *Schousb. Maroc. P.* 1. *p.* 168.—Habitat in monte Shibil Kibir ♃.

Affinis *Scillæ campanulatæ*, tamen diversa: corollis minoribus, minus patulis, nec apice subreflexis; foliis angustioribus involutis.

2. Scilla *tingitana:* S. floribus racemosis, bracteis solitariis pedunculo brevioribus, foliis lanceolatis planis, apice involutis. *Schousb. Maroc. P.* 1. *p.* 169.—Habitat in monte Shibil Kibir ♃.

Distinguitur ab antecedente simillima: foliis parum latioribus, brevius involutis; bractea tantum unica, pedunculo triplo breviore.

98.

Juncus *acutus* L. Sp. Pl. tom. 2. p. 204. is composed of two varieties, that have as good a claim to being distinct species as Juncus articulatus and sylvaticus, namely,

1. Juncus *acutus:* J. culmo nudo, panicula terminali, involucro diphyllo spinoso, capsulis obtusis calycem superantibus. *Schousb. Maroc. P.* 1. *p.* 177. (*excluso synonymo Linnæi var.* β.)—J. acutus *Linn. Sp. Pl. tom.* 2. *p.* 404. (*excluso synonymo Lamarckii et variet.* β.)—*Lamarck Encycl.* 3. *p.* 264.—*Smith Fl. Brit. vol.* 1. *p.* 374.

Calycis foliola ovata, obtusa.—Capsulæ rotundatæ, obsolete trigonæ, obtusissimæ, mucrone brevi terminatæ, calyce duplo longiores.—Planta 3- ad 4-pedalis, rigida, foliis et involucris valde spinosis.

2. Juncus *maritimus:* J. culmo nudo, panicula terminali, involucro diphyllo spinoso, capsulis acutis, calycem æquantibus. *Schousb. Maroc. P.* 1. *p.* 178. (*excluso synonymo Linn.* α.)—J. acutus β. *Spec. Plant. tom.* 2. *p.* 205. (*excluso synonymo Lamarckii.*)—J. maritimus *Lam. Encycl.* 3. *p.* 264.—*Smith Flora Brit. vol.* 1. *p.* 375.

Calycis foliola lanceolata, acuta.—Capsulæ triquetræ, acutæ, longitudine tantum calycis.—Planta antecedente triplo fere minor minusque rigida.

This species has also been frequently found by Professor Mertens in the downs of Holland.

99.

Under JUNCUS *articulatus α. aquaticus* Sp. Pl. tom. 2. p. 211. we find erroneously quoted the synonym of "Juncus articulatus, &c. *Hall. Hist. Helv. n.* 1322.;" but Haller expressly attributes to his plant *Flores argute mucronati.* This synonym rather belongs to a variety of Juncus sylvaticus, not yet noticed in the Species Plantarum.

JUNCUS *sylvaticus* Spec. Pl. 2. p. 211.—*γ. compressus*, culmo foliisque compressis striatis, bracteis longitudine florum. *Schousb. Maroc. P.* 1. *p.* 179.—Juncus articulatus *Desfont. Atl.* 1. *p.* 313.—Juncus foliis articulatis compressis, panicula semel ramosa. *Hall. Helv. n.* 1322.

Culmus compressus, striatus, pedalis et ultra.—Folia articulata, compresso-teretia, striata.—Bracteæ lanceolatæ, acuminatæ, longitudine fere florum.—Foliola calycina acuminata.

100.

Mr. Schousboe has discovered, in the neighbourhood of Mogadore, a new species of Frankenia, with leaves approaching to those of F. lævis, to distinguish it from which the specific character should undergo some change.

1. FRANKENIA *lævis:* F. herbacea procumbens, foliis linearibus basi ciliatis, floribus lateralibus. *Schousb. Maroc. P.* 1. *p.* 181.—F. lævis *Spec. Pl. tom.* 2. *p.* 241. (*excluso synonymo Barrelieri et Boccones.*)—*Smith Flora Brit. vol.* 1. *p.* 387.—*Desfont. Atl.* 1. *p.* 317.—*Lamarck Encycl.* 2. *p.* 543. (*exclusis synonymis Barrelieri et Boccones.*)

Caules procumbentes, herbacei, a basi ramosi.—Flores axillares aut terminales in ramis lateralibus.

2. FRANKENIA *thymifolia:* F. fruticosa, erecta, foliis linearibus basi ciliatis, floribus terminalibus. *Schousb. Mar. P.* 1. *p.* 182.—F. fruticosa *Desf. Atl.* 1. *p.* 316.—Polygonum fruticosum, &c. *Barrel. Ic.* 711. *Boccon. Mus.* 1. *t.* 7. *f.* 2.—Hab. in arenosis maritimis prope Mogadore ♄.

Caulis fruticosus, erectus, ramosissimus: ramis fastigiatis apice floriferis.—Folia crusta cinerea obducta.

101.

Though Linnæus has ascribed both calyx and corolla to *Triglochin*, yet it is clear from the intermediate insertion of the stamens, that this is erroneous. According to the principles by which we use to distinguish the calyx from the corolla, the integuments of the sexual organs of that genus ought to be considered as the former, and the generic character be thus expressed: *Calyx* hexaphyllus: *foliolis tribus superioribus* cum inferioribus alternantibus, petaloideis, paulo minoribus. *Corolla* nulla. *Stylus* nullus. *Capsula* basi dehiscens.

102.

Between Œnothera tetraptera and fruticosa Sp. Pl. tom. 2. p. 309, 310. insert

ŒNOTHERA *tetragona.—Roth Cat. Botan. fasc. 2. p.* 39.—Habitat in America ♃.

Distinguitur ab Œ. *fruticosa*, cui proxime accedit, 1. Foliis ovalibus, obtusis; nec lanceolatis, acutis. 2. Floribus magnitudine et colore Œ. *biennis*. 3. Calycis tubo cylindraceo; nec filiformi, angustissimo. 4. Capsula quadrialata, brevi; nec oblongo-clavata.

103.

Cassia nictitans and procumbens Sp. Pl. tom. 2. p. 529, 530. are very nearly akin, and the Linnean specific differences not sufficient to distinguish them. I alter them as follows:

1. CASSIA *nictitans*.—C. foliis multijugis, caule erectiusculo herbaceo, pedunculis lateralibus trifloris, floribus subpentandris. *Roth Cat. Bot. fasc. 2. p. 42.—Sp. Pl. tom. 2. p. 529. Roth's Beiträge, vol. 2. p. 90. no. 4.*

2. CASSIA *procumbens*.—C. foliis multijugis, caulibus filiformibus procumbentibus herbaceis, pedunculis ternis

lateralibus unifloris. *Roth Cat. Bot. fasc. 2. p. 42. Sp. Pl. tom. 2. p. 530.*

104.

Hydrangea *hortensis* Sp. Pl. tom. 2. p. 633. M. Picot Lapeyrouse, at the conclusion of his paper on Valisneria (Journ. de Phys. Pluv. an vii.), having said that his observations relative to the flowers of *Hortensia* do not agree with the descriptions of the different authors, I last summer subjected this beautiful plant to a closer examination.—Prof. Willdenow, following Dr. Smith, has referred it to the genus Hydrangea; but, I think, not with good reason. The opposite conclusions that different describers have arrived at, make me suspect that since Kämpfer (who calls it *Sijo* in his Amœn. Exot. p. 854.), scarcely any, not even Jussieu himself, has observed the real fruit-bearing flowers.

As soon as the corymb begins to develope, two distinct kinds of flower-buds are observable: some few are completely globular, of the size of a hempseed or small pea; others are oblong, and resemble a developing leaf-bud. As the expansion of the corymb advances, the latter become so much elevated above the former that these are entirely hidden from the sight. On examining the corymbs when perfectly opened, and after the flowers have acquired their complete blush-red colour, two sorts of flowers of different construction may be observed. The outer ones, that form the large, round, and very dense corymb or cyme, have long pedicles: the large calyx, generally five-cleft to its base, has completely the appearance of a beautiful *corolla pentapetala.* The corolla itself, with its sexual parts, is, in proportion to the calyx and the fertile flowers, very small, and always steril: I constantly observed in it eleven stamens and three styles. On opening the corymb there appear in the lowermost axils of its branches, some single, purple flowers, that always expand sooner than the steril corollas:

they are situate on short thick pedicles, are furnished with a five-toothed, minute, almost fleshy calyx, and their five-petalled corolla with its sexual parts exceeds in size those of the outer steril flowers by three or four times. The petals are oblong-ovate, blunt, erect, concave, with somewhat connivent tips. They constantly contain eleven erect, purple stamens, of the same length with the petals. The three green blunt styles are of half the length of the filaments, rather diverging towards the top, and marked, at the inner surface, with an ash-coloured longitudinal furrow. The ovary is oblong-ovate, and generally covered by the calyx. These hermaphrodite flowers are all fertile, and nearly faded, when the outer steril ones begin to expand. A transverse section of the unripe fruit discovers three semi-circles, that appear to indicate three cells.—I have since examined this plant in several other gardens, and always found its flowers of the same construction.

The number of the male and female sexual parts differs too materially from that of Hydrangea to permit these plants to be considered as congeners. Hortensia should therefore constitute a new genus in the third order of the eleventh class of the Linnean system.

105.

Talinum *Anacampseros* Sp. Pl. tom. 2. p. 862.—For several years I have been in possession of a plant nearly allied to this species, flowering and producing seed at the same time with it, but in its habit, as well as in the structure of its parts, deviating enough to constitute a distinct species. A comparison of the parts of both will show the difference.

1. Talinum *Anacampseros*.—T. foliis ovatis glabris subtus convexo-gibbis, racemo simplici, pedunculo tereti.

Caulis subflexuosus.—Folia saturate viridia, glabra, lævia, supra planiuscula et læviter canaliculata, subtus convexo-gibba.—Flores pulcherrime rosei.—Calycis diphylli

foliola lato-lanceolata.—Petala ovata, mucronata, infra apicem non raro tenuissime incisa.—Stamina ad 40: Filamenta colore petalorum: Antheræ saturate luteæ.—Germen ovatum, læte viride: Stylus staminibus longior, albus: Stigmata tria, nivea, oblonga, erecta, conniventia.

2. **Talinum** *arachnoideum*.—T. foliis ovatis utrinque convexo-gibbis apice villoso-arachnoideis, racemo simplici, pedunculo tereti.—Hab. ad Cap. B. Spei. ♄.

Caulis cum pedunculo rectus.—Folia duplo vel triplo minora quam in antecedente, fusco-viridia, lucida, punctis depressis notata, utrinque convexo-gibba, ad apicem villo arachnoideo tenui albo adpresso prædita.—Flores duplo minores quam in antecedente, pallide carnei.—Calycis diphylli foliola lanceolata, duplo angustiora quam in *Anacampserote*.—Petala lanceolata, obtusa, integerrima.—Stamina vix 20: Filamenta nivea: Antheræ sulphureæ.—Germen oblongo-ovale, fusco-virescens: Stylus niveus, vix staminum longitudine: Stigma simplex, oblongum, niveum.—Semina duplo minora quam in antecedente.

106.

Euphorbia *heterophylla* Spec. Pl. tom. 2. p. 891.—In giving a short description and figure of Euphorbia cyathophora (Botan. Abhandl. und Beobacht. p. 47. n. 9. t. 7.), I have observed that Plumier's figure of Tithymalus heterophyllus *tab*. 251. *f*. 3. did not exactly agree with either of these species. The branch, represented on the left as issuing out of the stem, is very much like Euphorbia cyathophora; while the rest of the figure appears to represent E. heterophylla.

107.

Mespilus *germanica* Spec. Pl. tom. 2. p. 1010.

In its wild state this tree is always furnished with shining thorns, as has already been observed in my Flora Germanica,

nica, vol. ii. P. 1. p. 557. and also by Haller (Hist. Helv. n. 1094.); though when cultivated it is entirely without. In the specific difference, therefore, it should be *spinosa* instead of *inermis*.

108.

FRAGARIA *sterilis* Spec. Pl. 2. p. 1093.—This plant has nothing in common with its present congeners, but a resemblance in the flowers and leaves, which scarcely appears sufficient to suffer it to remain with a genus, the character of which is inapplicable to it. If *Fragaria*, *Potentilla*, and *Comarum*, are given as distinct genera, the characters of which are derived from the nature of the receptacle of the fruit, the barren strawberry, having no berry-like receptacle falling off when ripe, but one that is dry, spongy, and persistent, cannot remain with Fragaria: agreeing, however, in character with that of *Comarum*, there is no reason why it should not be referred to this genus.

109.

Between Cistus squamatus and Lippii Spec. Pl. tom. 2. p. 1201. insert

CISTUS *distachyos:* C. suffruticosus stipulatus erectus, foliis oppositis ovali-oblongis incanis, racemis terminalibus foliosis bipartitis, floribus oppositifoliis. *Roth Cat. Bot. fasc.* 1. *p.* 62.—Habitat in Lusitania ♄.

110.

Between Mentha Auricularia and sylvestris Sp. Pl. tom. 3. p. 74. should be inserted

MENTHA *canescens:* M. spicis oblongis, foliis cordato-oblongis serratis breviter petiolatis subtus tomentosis, staminibus corolla brevioribus. *Roth Cat. Bot. fasc.* 2. *p.* 46.—M. cattaria hispanica, olim, &c. *Bauh. Hist.* 3. *p.* 226. (*quoad descriptionem, exclusa figura*) et M. cattaria hispanica angustioribus foliis *Ibid.* (*quoad figuram exclusa descriptione.*)—M. cattaria latifolia *Lobel Icon. p.* 511.—*C. B. Pin. p.* 228.—Habitat in Hispania ♃.

Differt a M. auricularia, cui proxime accedere videtur.—
1. Caule obsolete tetragono, tactu molli; nec tetragono, lateribus excavatis, hispido. 2. Foliis evidenter petiolatis, cordatis, subtus tomentoso-albis; nec subsessilibus, piloso-hispidis. 3. Staminibus corolla constanter brevioribus; nec longioribus. 4. Filamentis glaberrimis; nec pilosis.

111.

MENTHA *rotundifolia* Sp. Pl. tom. 3. p. 77. ♄.—To this belongs

β. variegata ♃.

M. rotundifolia *Smith Fl. Brit. vol. 2. p.* 611. *var. β. cum synonymis* ♄.—M. rugosa *Roth Cat. Bot. fasc.* 1. *p.* 65. *cum synonymis.*—Obs. Folia sæpius variegata profert ⊙.

112.

STACHYS *intermedia* Hort. Kew. vol. 2. p. 201.—Spec. Pl. tom. 3. p. 99.—A synonym to this species is S. *biennis* verticillis multifloris, foliis cordatis serratis tomentosis rugosis, caule lanato *Roth Cat. Bot. fasc.* 1. *p.* 68.—Radix mitis semper biennis ♂.

113.

Between Origanum Majorana and Majoranoides Spec. Pl. tom. 3. p. 137. belongs

O. *salvifolium,* spicis ovatis aggregatis villosis, foliis ovatis petiolatis tomentosis rugosis integerrimis. *Roth Cat. Bot. fasc.* 2. *p.* 48.—Habitat . . . . . . ♄.

Quoad habitum media quasi planta inter Orig. Majorana et Majoranoides.—A priore distinguitur, caule fruticoso; foliis tomentoso-mollissimis, rugosis; spicis ovatis, pluribus in pedunculo communi. A posteriori recedit: foliis ovatis, rugosis, mollissimo tomento tectis; spicis exovato magis oblongis, nec rotundis; bracteis ovatis, nec subrotundis; corolla duplo vel triplo majore; labio corollæ superiore integerrimo recto, nec emarginato, adscendente.

114.

Between Thymus lævigatus and vulgaris Sp. Pl. tom. 3. p. 139. comes in

THYMUS *ericæfolius*.—T. capitulis lateralibus oppositis dimidiatis pedunculatis paucifloris, caule fruticoso filiformi brachiato diffuso, foliis margine reflexis linearibus. *Roth Cat. Bot. fasc.* 2. *p*. 50.—Habitat in Gallia? ♄.

Habitus *Thymi vulgaris*, at calyce præprimis dignoscitur; longe enim minor et tenuior est in nostra planta, dentesque omnes æquales, setacei; in *Thymo vulgari* inæqualis est, dentibus tribus labii superioris brevibus lanceolatis, duobus labii inferioris linearibus longioribus.

115.

After Ocymum gratissimum Spec. Pl. tom. 3. p. 160. insert

1. OCYMUM *urticifolium*.—O. caule fruticoso, foliis ovato-lanceolatis subtomentoso-scabris, racemis terminalibus longis simplicibus, bracteis ovato-lanceolatis reflexis, infra medium conduplicatis. *Roth Cat. Bot. fasc.* 2. *p*. 52.—Habitat ...... ♄.

Quam maxime accedere videtur O. gratissimo, at folia ad totam superficiem subtomentoso-scabra; nec ad costam tantum. Bracteæ ovato-lanceolatæ, reflexæ, infra medium conduplicatæ; vel cordatæ acutæ; et flores non parvi.

2. OCYMUM *viridiflorum*.—O. caule fruticoso, foliis ovalibus scabriusculis, racemis terminalibus simplicibus, bracteis cordato-acuminatis planis reflexis. *Roth Cat. Bot. fasc.* 2. *p*. 54.—Habitat .... ♄.

Sub nomine *Ocymi scutellarioidis* in hortis quibusdam provenit, a quo tamen distinctissimum. ♂.

116.

The specific phrase, as well as the synonymy of Digitalis lutea and ambigua stand in need of reformation, as both these species have been hitherto confounded with two others.

1. DIGITALIS *ambigua.*—D. calycinis foliolis lanceolatis inæqualibus, corollis pubescentibus; galea lata læviter emarginata; labii inferioris lacinia intermedia acuta, foliis ovato-lanceolatis pubescentibus. *Roth Cat. Bot. fasc.* 2. *p.* 59.—D. ambigua *Spec. Pl. tom.* 3. *p.* 285. (excluso synonymo Murray.)—*Schkuhr Bot. Handb.* 2. *p.* 200. *t.* 174.—D. lutea flore majore, folio latiore. *I. Bauh. Hist.* 2. *p.* 813.

OBS. This species, except with regard to the colour of the flowers, has not the least resemblance to D. *lutea,* but it is more akin to D. *purpurea.*

2. DIGITALIS *media.*—D. calycinis foliis lanceolatis æqualibus, corollis læviter pubescentibus: galea emarginato-bifida, foliis basi et margine pubescentibus. *Roth Cat. Bot. fasc.* 2. *p.* 60.—D. ambigua *Murray Prodr. Fl. Gott. p.* 62. (exclusis synonymis.)—D. lutea *Roth Fl. Germ. tom.* 2. *P.* 2. *p.* 60. (exclusis synonymis Linnæi, Crantzii et Scopoli.)—D. major lutea seu pallida parviflora. *Bauh. Pin. p.* 244.—D. lutea parva *Lobel Icon. p.* 573. (*panicula seorsim delineata.*)—D. purpurea quarta *Dodon. Pempt. p.* 169. ♃.—D. flore minore subluteo, angustiore folio. *I. Bauh. Hist.* 2. *p.* 814.

Habitat in Palatinatu. D. Koch. ♃.

3. DIGITALIS *lutea.*—D. calycinis foliolis lanceolato-linearibus æqualibus, corollis glabris acutis: galea acute bifida; labii inferioris lacinia intermedia lanceolato-subulata, foliis glaberrimis. *Roth Cat. Bot. fasc.* 2. *p.* 62.—D. lutea *Spec. Pl. t.* 3. *p.* 285. (*exclusis synonymis Roth et fratr. Bauhinorum.*—D. angustifolia lutea *C. Bauh. Pin. p.* 244.—D. lutea parva *Lobel. Ic. p.* 573. (*exclusa panicula sinistrorsum delineata.*)

4. DIGITALIS *purpurascens.*—D. calycinis foliolis lanceolatis inæqualibus, corollis glabris: galea obtuse emarginata;

labii

labii inferioris lacinia intermedia oblonga obtusissima, foliis subtus pubescentibus. *Roth Cat. Bot. fasc.* 2. *p.* 62.—Habitat in Palatinatu. D. Koch. ♃.

117.

DIGITALIS *lanata* Spec. Pl. tom. 3. p. 287.—β. Winterli ♄.—Digitalis Winterli *Roth Cat. Bot. fasc.* 1. *p.* 71.—D. nova *Winterl. Hort. Pest.* △.

Quamvis habitu quodammodo recedat a *Digitali lanata*, tamen specie non distinguenda est. Recedit ab illa: 1. Caule altiore demum ramoso. 2. Spica laxiore, minus lanata. 3. Corollis minoribus, saturatioribus, minus ventricosis, maculis intus obscure ferrugineis. 4. Labio inferiore venis purpurascentibus picto. 5. Staminibus duobus longioribus labio superiori æqualibus.

118.

CAPRARIA *lucida* Hort. Kew. vol. 2. p. 353.—Spec. Pl. tom. 3. p. 324.—This plant is totally different from its present congeners, both in the structure of its flowers and that of the fruit. Capraria, according to the generic character given to it, is to have a bell-shaped pointed corolla, and a two-valved bilocular capsule. The plant in question, however, has a salver-shaped, five-cleft corolla, with roundish divisions, and the faux shut up by hairs, while its fruit is a succulent bilocular berry. Being unacquainted with any genus to which it may be more properly referred, it is to constitute a new one, which I consecrate to the memory of the deserving botanist Dr. Borkhausen.

BORKHAUSENIA.—Calyx 5-partitus. Corolla hypocrateriformis; ore villis clausa; tubo subcurvo. Bacca bilocularis, polysperma.

BORKHAUSENIA *lucida* ♄. Roth Cat. Bot. fasc. 2. p. 56.

III. *Determination*

III. *Determination of a new aquatic vegetable Genus, called* CAULINIA, *with general Observations on Water-plants, by* C. L. WILLDENOW*.

THOUGH botanists have now for more than a century been zealously employed in investigating such objects within their department as seem most worthy the notice of the curious, and though during that period they have directed their attention over the whole surface of our globe, yet it cannot be denied that even in Germany there exist many plants entirely unknown, and a far greater number imperfectly determined with respect to their characters, drawn from the structure of their sexual parts; and it is indeed surprising how these vegetables could for so long a time have escaped the vigilance of botanists. This observation is particularly applicable to the aquatic plants, whose station, being for the most part in places difficult of access, opposes a barrier to the scrutinizing eye of the naturalist. I do not allude to the natives of the waters of distant countries: on these the number of good observations is but very small; most of the accounts we have of them being given by superficial travellers, who, without a competent knowledge of their subject, have generally confounded new and undescribed aquatics with such as they had before seen in other parts of the world, and thus loaded the science with errors and ambiguities that time alone can dissipate.

Aquatic plants, as well as the terrestrial, are divided into two distinct tribes; the one in which the parts of the flower are distinctly visible, the other in which the naked eye cannot discover the sexual organs. The latter are called by Linnæus *Cryptogamous* plants; and the former have been denominated by me *Phænogamous*. These vegetables, furnished with perceptible flowers, have been generally called sexual: but, since in all plants known to us the sexual organs have been detected, it is evident that this name cannot be applied exclusively to one division; whence I have thought it proper to use the term Phænogamous as opposite to that of Cryptogamous.

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* Memoires de l'Académie Royale des Sciences de Berlin, 1801. p. 78.

The number of cryptogamous aquatics being so very extensive as to preclude the possibility of concentrating the traits that characterize them within the limits assigned to this paper, I shall for the present pass them over in silence; the species of phænogamous plants that inhabit the water, though likewise very numerous, are to those of the former in the proportion of only one to a hundred. After premising some general observations on aquatics with visible flowers, I shall determine the character of a new genus belonging to them.

The flowers of phænogamous aquatics are, generally speaking, not very striking to the eye, and mostly of a green colour, such as *Potamogeton, Ruppia, Zanichellia, Najas, Chara, Ceratophyllum, Callitriche, Hippuris, Lemna,* and many others. Often, too, their flowers are white; *Nymphæa alba, Stratiotes, Hydrocharis Morsus-ranæ, Alisma natans,* &c.: more seldom yellow; *Nymphæa lutea, Menyanthes nymphoides, Utricularia:* very rarely red, of which colour there is but one instance known in Europe, viz. *Polygonum amphibium**: blue is equally rare in our climate, but occurs in *Lobelia Dortmanna:* in the hot climates, however, and even in North America, many aquatics are found with blue flowers, such as *Utricularia cœrulea,* the whole genus *Pontederia*; but, generally speaking, this colour, as well as the red, is but rarely met with in aquatic plants.

These plants may be distributed into five divisions, according to their habit and the different position of their flowers and leaves; and one is even tempted to believe that nature has formed as it were those vegetables of every climate after five such types or models.

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* *Butomus umbellatus?*—Ed.

To the *first type* I refer such as are branched, and have stems, leaves, and flowers considerably raised above the level of the water. The leaves which they produce below the surface of the water generally display less surface and more minute sections than those that vegetate in the air; as for instance, *Sisymbrium amphibium, Sium latifolium, angustifolium, Phellandrium aquaticum, Cicuta virosa,* &c. All the plants of this first division will also thrive in marshy ground not overflowed by water.

To the *second type* are to be referred those plants that have their leaves at the bottom of the water, and their flower-bearing stem rising considerably above its surface; such as *Butomus umbellatus, Lobelia Dortmanna, Vallisneria spiralis, Hottonia palustris, Utricularia vulgaris, intermedia, minor,* &c. The plants of this division have on the whole showy flowers, and none of them can continue to live any considerable time if their leaves are not covered by the water.

The *third type* comprehends such aquatics as have their roots spreading below, and their leaves more or less heart-shaped on the surface of the water; viz. *Nymphæa, Nelumbium, Hydrocharis, Alisma natans, Polygonum amphibium, Ranunculus aquatilis, Trapa natans, Lemna,* &c. When these plants have a long and trailing stalk, this part is furnished at its immersed portion with leaves more finely cut: they will not thrive without water, with the sole exception of *Polygonum amphibium.* Their flowers are exactly level with the surface of the water.

The *fourth type* includes such as have both their stalk and leaves floating under the water, and their flowers alone rising above its surface, either single or disposed in short spikes; *Potamogeton, Myriophyllum, Ruppia, Zanichellia, Callitriche,* &c. The flowers of these plants are for the most part unsightly, and their leaves either finely divided or very slender.

The *fifth type* presents itself in such phænogamous aquatics as have all parts, the flowers as well as the leaves and stalks, submersed; such as *Ceratophyllum*, *Najas*, *Chara*. This last division, which I consider as the most interesting of all, will constitute the subject of the remaining part of this paper.

It has been considered as an axiom, applicable as well to the aquatic as to the terrestrial phænogamous plants, that their fecundation, the organs for which are contained within the flower, cannot be performed except in open air; for, as experience has taught us that the application of water to the sexual organs most effectually impedes that function, so it was inferred that the phænogamous aquatics must all raise their flowers above the surface of the water at the time of their impregnation. Nobody has hitherto opposed this opinion, though it is certain that tne plants of the fifth division vegetate entirely below the water, without ever elevating their flowers to its surface.

This mode of impregnation is the more remarkable, as we observe in all other phænogamous plants the great precaution nature has taken in order to exclude from their flowers rain and other moisture that might injure them, while in this case the parts of the flower are found buried in the same liquid, supposed to be so unfavourable to fecundation. But in this, as in many other processes of nature, we see that none of the rules which man deduces from his observations are without their exceptions: with her a thousand different tracks lead to the same end, though our imperfect understanding might think it accessible at one point only. The fecundating substance of the male organs has been hitherto found immiscible with water; a drop of the latter brought on the female organ keeps off the pollen, as is shown by the effect of long continuing rains at the time of the flowering of fruit-trees and corn. It is therefore not surprising that the axiom, that vegetable fecundation cannot take place under water, should have been made too general, and applied to aquatics also, especially as in most of them the flowers, before they open, are raised above the level of the water.

We know that a secondary means of vegetable fecundation is afforded by insects, without whose assistance the greater part of plants would never produce any seeds fit for reproduction. Now such assistance being in this case precluded, how is it possible, if their pollen is immiscible with the water in which they float, that the male flowers can fecundate the female ones when separated, as in *Ceratophyllum* and *Najas?* I have twice had an opportunity of examining the flowers of Ceratophyllum, and have found the fecundating substance of quite a different nature from that of other plants, in which the male organs show an anther either covered with a pellicle opening in the different species in various manner to emit the pollen, or, as in the Orchideæ and Asclepiadeæ, not covered by a pellicle, but composed of an unctuous fecundating mass: In Ceratophyllum the anther is at first hard, but afterwards becomes soft, so as to take all impressions, and apparently of an oily nature. Perhaps, therefore, we may consider the water to be for the plants in question the vehicle of the fecundating matter. The experiments of Kölreuter having proved that a very small number of the molecules of pollen is sufficient to effect fecundation, one may easily conceive that some particles of the viscous substance of the male flowers, mixed with the water, may be conveyed, by means of this liquid, constantly in agitation, to the female flowers. Having, however, but twice seen the flowers of *Ceratophyllum demersum*, and only once those of *Najas minor* of Allioni, I shall suspend my opinion upon a subject concerning which we can scarcely expect to arrive at certainty, on

account

account of the impracticability of making long and satisfactory observations and experiments on the ruffled surface of a lake or running water. In the mean time, the only mode of explaining the fecundation of the phænogamous plants flowering under water seems to be, to admit the solubility of their pollen in that fluid, or at least to allow that the water does not, in these plants, prevent the pistil from receiving the fecundating substance of the anthers, as is the case in the vegetables that flower in open air. As other botanists may be more successful in these researches, we have still to hope that time will furnish us with a more satisfactory solution of the problem.

The local difficulties which oppose themselves to the observation of the aquatic are the principal cause that the structure of their flowers is so very little understood. Thus, but few botanists have had opportunities of seeing those of the common *Lemna*; Micheli, Valisneri and Ehrhart, have observed those of *Lemna gibba*; Graver has determined the inflorescence of *Lemna polyrhiza*; Linnæus that of *Lemna minor*, of which I likewise have often observed the flower and also the fruit, which is a *capsula compressa obcordata bilocularis disperma*. As for *Lemna trisulca*, though there is scarcely a pond or a ditch where it is not found, no botanist, that I know of, has as yet been fortunate enough to see either its flower or fruit; we must therefore suspend our judgment in regard to this latter vegetable, of which indeed it cannot with certainty be said whether it belong to the Lemnæ, or should be referred to the class Cryptogamia*.

Vaillant and Dillenius have observed the flowers of *Ceratophyllum*; but probably Linnæus has not had an opportunity to see them himself, his description being evidently borrowed from these botanists. My own observations having furnished me with results not perfectly agreeing with Linnæus's account, I think it proper to avail myself of this opportunity to give a description of this flower, such as I have found it.

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* Mr. Wolff, whose Dissertation *de Lemna* we have had an opportunity of mentioning in our Retrospect of Botanical Literature (Ann. of Bot. vol. i. p. 26.), has since thrown light upon the subject above alluded to.—Ed.

CERATOPHYLLUM *demersum.*

Flores masculi.

CALYX. *Perianthium* multifidum, laciniis subulatis æqualibus.

COROLLA nulla.

STAMINA. *Filamenta* sedecim brevissima. *Antheræ* oblongæ obtusæ tricuspidatæ.

Flores feminei in eadem planta.

CALYX. *Perianthium* hexaphyllum imbricatum.

COROLLA nulla.

PISTILLUM. *Germen* ovatum compressum, *Stylus* filiformis, *Stigma* simplex.

PERICARPIUM. *Nux* tricuspidata monosperma.

Nor do the flowers of *Najas* seem to have been examined but by a small number of botanists. The description which Linnæus gives of this genus clearly indicates his not having observed it himself in its flowering time, but that he has followed Micheli. This latter naturalist, who has searched after truth in the vegetable kingdom with the same indefatigable zeal and sagacity that mark the entomological researches of Reaumur, distinguishes three species of Najas, considered by Linnæus only as so many varieties. Allioni, who had an opportunity of comparing those species which Micheli had described and figured under the name of *Fluvialis,* introduced by Vaillant, gives the name of *Najas major* to the first and second, reserving to the third the name of *Najas minor.* (See his excellent *Flora Pedemontana, tom. ii. p.* 221. *no.* 2105 and 2106.) It was formerly believed that *Najas minor* of Allioni existed only in Italy; but Mr. Schkuhr of the university of Wittenberg, has found it in the neighbourhood of that town, and I also saw it, in 1793, at Grünewald near Berlin. Micheli has only seen the female flowers, and I sought after the male ones for several years, and without success, till the month of August 1799. Mr. Schkuhr has however already given a figure of it in his Manual of Botany, pl. 296.

I soon perceived, on examining the flower, that this plant constitutes a new and absolutely distinct genus, which consequently is to be denoted by an appropriate name. M. Caulini[*], a wealthy Neapolitan gentleman, who has contributed to the science of botany by a memoir replete with nice observations on an aquatic plant denominated by Linnæus *Zostera*, meriting the honour of having a plant called after his name, I think it proper to give the new genus which I am about to describe the name of *Caulinia*.

To facilitate the comparison of the differences existing between *Caulinia* and *Najas*, I shall here give the generic characters of both.

NAJAS.

Flores masculi.

CALYX. *Perianthium* monophyllum campanulatum, limbo bilobo, laciniis oblongis revolutis.

COROLLA monopetala infundibuliformis. *Tubus* filiformis, calyce multo longior. *Limbus* campanulatus quadrifidus: laciniis lanceolatis revolutis.

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[*] The name of that gentleman, in Italian, is Sr. Filippo Cavolini. Besides two publications on Polypi and the Generation of Fishes, he wrote an interesting pamphlet; *Zosteræ oceanicæ Linnæi* Ανθησις; *contemplatus est* P. CAULINUS *Neapolitanus, annis* 1787 *et* 1791, *Napoli* 1792, *fol.*: and in the same year another equally instructive paper; *Phucagrostidis Theophrasti* Ανθησις; *contemplatus est P. C. anno* 1792; of the former of which we shall give a translation in this number. There are two other botanical dissertations extant of the same naturalist; the one, *Memoria per servire alla Storia compiuta del Fico e della proficazione*,—the other, *Riflessioni sulla generazione dei Funghi*, both inserted (as well as his memoir on the Monoculus Pulex) in the *Opuscoli scelti.* Cfr. Dryand. Cat. Bibl. Banks.—ED.

STAMINA. *Filamenta* nulla. *Antheræ* quatuor fauci corollæ insertæ connatæ.

Flores feminei in eadem planta.

CALYX nullus.

COROLLA nulla.

PISTILLUM. *Germen* oblongum, *Stylus* brevis subulatus, *Stigma* bi- s. trifidum.

PERICARPIUM. *Capsula* elliptico-ovata unilocularis mono- s. tetrasperma.

SEMINA oblonga obtusa.

I have not had an opportunity of seeing any other species than that called by Micheli *Fluvialis latifolia fructu minus obtuso monospermo* (Nov. Pl. Gen. p. 11. t. 8. f. 2.), and the specimens that fell under my observation were in fruit only, whence the other characters are given from the description of Micheli, whose accuracy is too well known to give room to any doubt: it may, however, seem necessary to pay some attention to the difficulties that the difference in the descriptions given by other botanists appears to throw in our way. Vaillant makes no mention of a corolla, which is described and figured by Micheli. On inspecting Vaillant's delineation, one is inclined to suspect either that the segments of the corolla were already fallen off in his specimens, or that they had not yet opened. Jussieu thinks Linnæus incorrect in attributing to this flower a quadripartite corolla; according to him there are, in place of such four segments of a corolla, four valves or appendages belonging to the anther. Nevertheless, as Micheli, who is acknowledged to be scrupulously exact in the description of the parts of plants, has positively charged Vaillant with incorrectness respecting the point in question, I have thought proper to follow the opinion of the former naturalist. All botanists too, with the sole exception of Linnæus, agree in ascribing to Najas male and female flowers, distinct on the same individual; whence this plant belongs to the 21st class, Monoecia, not to the 22d, Dioecia, of the sexual system. According to Linnæus, Najas is furnished with a single anther only, whilst the figure of Micheli announces *four* ; whence I refer the genus to *Monoecia Tetrandria*.

As to the question, Whether the two first species of *Fluvialis* of Micheli be not varieties, or whether they constitute two distinct species, thus making two species of Najas, I must leave it to the decision of those botanists that have an opportunity of comparing the two plants with each other. With regard to *Najas minor* of Allioni, which is the third *Fluvialis* of Micheli, I have already mentioned that this constitutes a new genus, of which the following is the character of the flower.

CAULINIA.

Flores masculi.

CALYX nullus.

COROLLA nulla.

STAMEN. *Filamentum* nullum. *Anthera* oblonga apice dehiscens.

Flores feminei in eadem planta.

CALYX nullus.

COROLLA nulla.

PISTILLUM. *Germen* ovatum, *Stylus* filiformis caducus, *Stigma* bifidum.

PERICARPIUM. *Capsula* oblonga monosperma.

SEMEN oblongum ovatum.

Caulinia belongs to the same class with Najas, but to the first order, Monoecia Monandria. Its female flower has the same construction as that of Najas, but the male flower differs much from it by the absence of both calyx and corolla. It would perhaps not be committing an error to class Caulinia among the plants with hermaphrodite flowers, there being produced in each angle of the young branches a pistil with one or two anthers; but as neither of these parts is surrounded by either calyx or corolla, and as they are disposed without order one by the side of the other, it seems more proper to consider each individual organ as a flower. The pistils and anthers at the flowering time are so small, that it is scarcely possible to discover them without the assistance of a microscope.

I was at first of opinion that there existed but one species of this genus; but I have since discovered two other exotic water-plants that agree precisely with our Caulinia in the structure of the female flower: whence I have no scruple of referring them to this new established genus. As for the male flowers, it is impossible, even in our original Caulinia, to characterize them from dried specimens. The three species of this genus are,

1. CAULINIA *fragilis*, foliis ternis oppositisve, lineari-subulatis recurvatis aculeato-dentatis rigidis. *Tab.* 1. *fig.* 2.

Najas minor *Allion. Pedem. no.* 2106.—*Schkuhr Bot. Handb. iii. p.* 250. *t.* 296.

Fluvialis minor, foliis angustissimis denticulatis deorsum reflexis, fructu acuto majori monospermo. *Micheli Gen. p.* 11. *t.* 8. *f.* 3.

Fluvialis angusto longoque folio *Vaill. Act. Paris.* 1719. *p.* 17.

Habitat in lacubus et fluviis Italiæ, Galliæ, et Germaniæ.

Radices filiformes, simplicissimæ, longissimæ, perpendiculares.

Caulis digitalis usque spithameus, basi ramosus, diffuso adscendens; ramis dichotomis, glabris, compressis.

Folia terna vel opposita, lineari-subulata, acuta, recurva, uncialia et ultra, reflexa, angustissima, dentata: dentibus alternis, mucronatis, basi in vaginam membranaceam subrotundam apicem versus dentatam desinentia.

Flores in foliorum axillis sessiles.

Stigmata variant numero, nempe unum, duo aut tria.

The whole plant is very brittle, so much so that, in its fresh as well as dry state, the stalk and leaves will break to pieces like glass when touched by the hand. I have even observed that, whilst growing under the water, where the depth is not great, the dashing of the waves is sufficient to break them.

2. CAULINIA *indica*, foliis ternis oppositisve, lineari-subulatis repandis, junioribus setaceo-dentatis. *Tab.* 2.

Sub aqua degit prope Tranquebar.

Caulis sesqui- vel bi-pedalis, natans, teres, filiformis, dichotomo-ramosus.

Folia ramorum præcipue ad dichotomiam terna caulina opposita, lineari-subulata, patentia, recta, basi vaginantia, juniora setaceo-dentata, seniora ob dentes deciduos repanda.

Flores in foliorum axillis sessiles.

Germen oblongum. Stylus filiformis. Stigmata bina, simplicia.

Though very like the former, this species still differs from it in several respects: it is much larger, flexible, and never in the least brittle; its leaves are not bent backwards; when young they have sharp bristle-shaped teeth, that afterwards drop off, which renders the full-grown leaves sinuose at the border.

3. CAULINIA *flexilis*, foliis senis linearibus apice denticulatis patentibus. *Tab.* 1. *fig.* 1.

Habitat sub aquis Pennsylvaniæ.

Caulis pedalis, subdichotomus, ramosus, filiformis, teres.

Folia sena, verticillata, linearia, patentia, apice denticulata, inferne integerrima, basi vaginantia.

Flores axillares, sessiles.

Germen oblongum. Stylus filiformis. Stigmata bina, simplicia.

This species is quite distinct from the others, it is very flexible, its leaves grow constantly by fives or sixes, and are only toothed near the points.

Explanation of Plates I. *and* II.

Pl. I. Fig. 1. *Caulinia flexilis*. The whole plant, natural size. a. A leaf magnified.

Fig. 2. *Caulinia fragilis* nat. size. a. Male and female flowers magnified, as all the rest but g.;—b. male flower;—e. the same separated;—c. f. female flower;—h. the same having ripened the seed g.;—i. the seed separated;—d. leaf magnified. (N. B. We have given Mr. Schkuhr's figure of this species in preference to that of Mr. Willdenow.)

Pl. II. *Caulinia indica*. The whole plant, natural size. a. A young leaf magnified; b. a full grown leaf magnified.

IV. *A short Account of the Cause of the Disease in Corn, called by Farmers the Blight, the Mildew, and the Rust.*

By the Rt. Hon. Sir JOSEPH BANKS, *Bart. K.B. P.R.S.*[*]

BOTANISTS have long known that the Blight in Corn is occasioned by the growth of a minute parasitic fungus or mushroom

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[*] In our last number we announced the intention of the President of the Royal Society to publish an account of the blight in wheat (*Uredo frumenti*) with highly magnified figures, drawn by that excellent artist Mr. Bauer of Kew. This account has been since printed, and copies of it have been distributed, through the liberality of the author, to such cultivators and naturalists as appeared most likely to profit by the discovery, or to promote further researches into a subject of such general interest.

To excite still further the attention of botanists to this subject, Sir Joseph has very obligingly presented the editors of these Annals with the original copper-plates, engraved from Bauer's drawings, with his permission to reprint mushroom on the leaves, stems, and glumes of the living plant. Felice Fontana published in the year 1767 an elaborate account of this mischievous weed*, with microscopic figures, which give a tolerable idea of its form; more modern botanists† have given figures both of corn and of grass affected by it, but have not used high magnifying powers in their researches.

Agriculturists do not appear to have paid, on this head, sufficient attention to the discoveries of their fellow-labourers in the field of nature; for though scarce any English writer of note on the subject of rural economy has failed to state his opinion of the origin of this evil, no one of them has yet attributed it to the real cause, unless Mr. Kirby's excellent papers on some diseases of corn, published in the Transactions of the Linnean Society, are considered as agricultural essays.

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print his valuable paper, which we doubt not will be highly acceptable to such of our readers as do not happen to possess the original.

In consequence of this paper the blight will be much better understood than it has hitherto been; nevertheless, it is to be considered not as a complete history of the disease, but rather as the beginning of a more accurate knowledge, to be hereafter obtained by the united labour of many observers. It is still necessary to watch its progress from its first appearance to the ripening of the seed; to observe the effects that different degrees of it produce upon the quantity or quality of the grain; whether, when confined to the lower part of the straw, or the sheaths of the leaves, it may be totally innoxious, or whether every degree of it is sure to be proportionally injurious; whether symptoms of it may be perceived on the first germination of the grain, thus inducing a belief of its existence in the seed corn, or whether it be rather adventitious at some period of the growth of the plant; what are the various circumstances that retard or promote its growth: these and many other particulars, necessary to complete the history of this mischievons fungus, can only be known by the united efforts of many observers; and we trust that the expectations of Sir Joseph, that abundance of such observations will be afforded by the intelligent agriculturists of the present day, will not be disappointed.—EDIT.

* Osservazioni sopra la Ruggine del Grano. Lucca, 1767, 8vo.

† Sowerby's English Fungi, vol. ii. tab. 140. Wheat, tab. 139. Poa aquatica.

On this account it has been deemed expedient to offer to the consideration of farmers, engravings of this destructive plant, made from the drawings of the accurate and ingenious Mr. Bauer, botanical painter to his majesty, accompanied with his explanation, from whence it is presumed an attentive reader will be able to form a correct idea of the facts intended to be represented, and a just opinion whether or not they are, as is presumed to be the case, correct and satisfactory.

In order, however, to render Mr. Bauer's explanation more easy to be understood, it is necessary to premise, that the striped appearance of the surface of a straw, which may be seen with a common magnifying glass, is caused by alternate longitudinal partitions of the bark, the one imperforate, and the other furnished with one or two rows of pores or mouths, shut in dry, open in wet weather, and well calculated to imbibe fluid whenever the straw is damp*.

By these pores, which exist also on the leaves and glumes, it is presumed that the seeds of the fungus gain admission, and at the bottom of the hollows to which they lead (see Plate IV. fig. 1. 2.), they germinate and push their minute roots, no doubt (though these have not yet been traced) into the cellular texture beyond the bark, where they draw their nourishment, by intercepting the sap that was intended by nature for the nutriment of the grain; the corn of course becomes shrivelled in proportion as the fungi are more or less numerous on the plant; and as the kernel only is abstracted from the grain, while the cortical part remains undiminished, the proportion of *flour to bran* in blighted corn, is always reduced in the same degree as the corn is made light. Some corn of this year's crop will not yield a stone of flour from a sack of wheat; and it is not impossible that in some cases the corn has been so completely robbed of its flour by the fungus, that if the proprietor should choose to incur the expense of thrashing and grinding it, bran would be the produce, with scarce an atom of flour for each grain.

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* Pores or mouths similar to these are placed by nature on the surface of the leaves, branches, and stems, of all perfect plants, a provision intended no doubt to compensate, in some measure, the want of loco-motion in vegetables. A plant cannot when thirsty go to the brook and drink, but it can open innumerable orifices for the reception of every degree of moisture, which either falls in the shape of rain and of dew, or is separated from the mass of water always held in solution by the atmosphere; it seldom happens in the driest season, that the night does not afford some refreshment of this kind, to restore the moisture that has been exhausted by the heats of the preceding day.

Every species of corn, properly so called, is subject to the blight; but it is observable that spring corn is less damaged by it than winter, and rye less than wheat, probably because it is ripe and cut down before the fungus has had time to increase in any large degree.—Tull says that "white cone or bearded wheat, which hath its straw like a rush full of pith, is less subject to blight than Lammas wheat, which ripens a week later." See page 74. The spring wheat of Lincolnshire was not in the least shrivelled this year, though the straw was in some degree infected: the millers allowed that it was the best sample brought to market. Barley was in some places considerably spotted; but as the whole of the stem of that grain is naturally enveloped in the hose or basis of the leaf, the fungus can in no case gain admittance to the straw: it is however to be observed that barley rises from the flail lighter this year than was expected from the appearance of the crop when gathered in.

Though diligent enquiry was made during the last autumn, no information of importance relative to the origin or the progress of the blight could be obtained: this is not to be wondered at; for, as no one of the persons applied to had any knowledge of the real cause of the malady, none of them could direct their curiosity in a proper channel.

Now that its nature and cause have been explained, we may reasonably expect that a few years will produce an interesting collection of facts and observations, and we may hope that some progress will be made towards the very desirable attainment of either a preventive or a cure.

It seems probable that the leaf is first infected in the spring, or early in the summer, before the corn shoots up into straw, and that the fungus is then of an orange colour*; after the straw has become yellow, the fungus assumes a deep chocolate brown: each individual is so small that every pore on a straw will produce from 20 to 40 fungi, as may be seen in the plates, and every one of these will no doubt produce at least 100 seeds: if then one of these seeds tillows out into the number of plants that appear at the bottom of a pore in Plate IV. fig. 1, 2. how incalculably large must the increase be! A few diseased plants scattered over a field must very speedily infect a whole neighbourhood; for the seeds of fungi are not much heavier than air, as every one who has trod upon a ripe puff-ball must have observed, by seeing the dust, among which is its seed, rise up and float on before him.

How long it is before this fungus arrives at puberty, and scatters its seeds in the wind, can only be guessed at by the analogy of others; probably the period of a generation is short, possibly not more than a week in a hot season: if so, how frequently in the latter end of the summer must the air be loaded as it were with this animated dust, ready, whenever a gentle breeze, accompanied with humidity, shall give the signal, to intrude itself into the pores of thousands of acres of corn! Providence, however, careful of the creatures it has created, has benevolently provided against the too extensive multiplication of any species of being: was it otherwise, the minute plants and animals, enemies against which man has the fewest means of defence, would increase to an inordinate extent: this, however, can in no case happen, unless many predisposing causes afford their combined assistance. But for this wise and beneficent provision, the plague of slugs, the plague of mice, the plagues of grubs, wire-worms, chafers, and many other creatures whose power of multiplying is countless as the sands of the sea, would, long before this time, have driven mankind, and all the larger animals, from the face of the earth.

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* The abbé Tessier, in his Traité des maladies des Grains, tells us, that in France this disease first shews itself in minute spots of a dirty white colour on the leaves and stems, which spots extend themselves by degrees, and in time change to yellow, and throw off a dry orange-coloured powder, pp. 201, 340.—*Additional note of the* AUTHOR.

Though all old persons who have concerned themselves in agriculture remember the blight in corn many years, yet some have supposed that of late years it has materially increased; this however does not seem to be the case. Tull, in his Horsehoeing Husbandry, p. 74, tells us, that the year 1725 "was a year of blight the like of which was never before heard of, and which he hopes may never happen again;" yet the average price of wheat in the year 1726, when the harvest of 1725 was at market, was only 36*s.* 4*d.* and the average of the five years of which it makes the first, 37*s.* 7*d.*—1797 was also a year of great blight; the price of wheat in 1798 was 49*s.* 1*d.* and the average of the five years, from 1795 to 1799, £63*s.* 5*d.**

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* The scarcity of the year 1801 was in part occasioned by a mildew which in many places attacked the plants of wheat on the south-east side only, but it was principally owing to the very wet harvest of 1800. The deficiency of wheat at that harvest was found, on a very accurate calculation, somewhat to exceed one-fourth; but wheat was not the only grain that failed; all others, and potatoes also, were materially deficient. This year the wheat is probably somewhat more damaged than it was in 1800, and barley somewhat less than an average crop. Every other article of agricultural food is abundant, and potatoes one of the largest crops that has been known; but for these blessings on the labour of man, wheat must before this time have reached an exorbitant price.—*Additional note of the* AUTHOR.

The climate of the British Isles is not the only one that is liable to the blight in corn ; it happens occasionally in every part of Europe, and probably in all countries where corn is grown. Italy is very subject to it, and the last harvest of Sicily has been materially hurt by it. Specimens received from the colony of New South Wales shew that considerable mischief was done to the wheat crop there in the year 1803 by a parasitic plant, very similar to the English one.

It has been long admitted by farmers, though scarcely credited by botanists, that wheat in the neighbourhood of a barberry bush seldom escapes the blight. The village of Rollesby in Norfolk, where barberries abound, and wheat seldom succeeds, is called by the opprobrious appellation of Mildew Rollesby. Some observing men have of late attributed this very perplexing effect to the farina of the flowers of the barberry, which is in truth yellow, and resembles in some degree the appearance of the rust, or what is presumed to be the blight in its early state.

It is, however, notorious to all botanical observers, that the leaves of the barberry are very subject to the attack of a yellow parasitic fungus, larger, but otherwise much resembling the rust in corn.

Is it not more than possible that the parasitic fungus of the barberry and that of wheat are one and the same species, and that the seed is transferred from the barberry to the corn? Misletoe, the parasitic plant with which we are the best acquainted, delights most to grow on the apple and hawthorn, but it flourishes occasionally on trees widely differing in their nature from both of these: in the Home Park, at Windsor, misletoe may be seen in abundance on the lime trees planted there in avenues. If this conjecture is founded, another year will not pass without its being confirmed by the observations of inquisitive and sagacious farmers.

It would be presumptuous to offer any remedy for a malady, the progress of which is so little understood: conjectures, however, founded on the origin here assigned to it, may be hazarded without offence.

It is believed* to begin early in the spring, and first to appear on the leaves of wheat in the form of rust, or orange-coloured powder; at this season, the fungus will, in all probability, require as many weeks for its progress from infancy to puberty as it does days during the heats of autumn; but a very few plants of wheat, thus infected, are quite sufficient, if the fungus is permitted to ripen its seed, to spread the malady over a field, or indeed over a whole parish.

The chocolate-coloured blight is little observed till the corn is approaching very nearly to ripeness; it appears then in the field in spots, which increase very rapidly in size, and are in calm weather somewhat circular, as if the disease took its origin from a central position.

May it not happen, then, that the fungus is brought into the field in a few stalks of infected straw uncorrupted among the mass of dung laid in the ground at the time of sowing? It must be confessed, however, that the clover lays, on which no dung from the yard was used, were as much infected last autumn as the manured crops. The immense multiplication of the disease in the last season, seems however to account for this; as the air was no doubt frequently charged with seed for miles together, and deposited it indiscriminately on all sorts of crops.

It cannot however be an expensive precaution to search diligently in the spring for young plants of wheat infected with the disease, and carefully to extirpate them, as well as all grasses, for several are subject to this or a similar malady, which has the appearance of orange-coloured or of black stripes on their leaves, or on their straw; and if experience shall prove that uncorrupted straw can carry the disease with it into the field, it will cost the farmer but little precaution to prevent any mixture of fresh straw from being carried out with his rotten dung to the wheat field.

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* This, though believed, is not dogmatically asserted, because Fontana, the best writer on the subject, asserts that the yellow and the dark-coloured blight are different species of fungi.

In a year like the present, that offers so fair an opportunity, it will be useful to observe attentively whether cattle in the straw-yard thrive better or worse on blighted than on healthy straw. That blighted straw, retaining on it the fungi that have robbed the corn of its flour, has in it more nutritious matter than clean straw which has yielded a crop of plump grain, cannot be doubted; the question is, whether this nutriment in the form of fungi does, or can be made to agree as well with the stomachs of the animals that consume it, as it would do in that of straw and corn.

It cannot be improper in this place to remark, that although the seeds of wheat are rendered, by the exhausting power of the fungus, so lean and shrivelled that scarce any flour fit for the manufacture of bread can be obtained by grinding them, these very seeds will, except, perhaps, in the very worst cases*, answer the purpose of seed corn as well as the fairest and plumpest sample that can be obtained, and in some respects better; for as a bushel of much blighted corn will contain one-third at least more grains in number than a bushel of plump corn, three bushels of such corn will go as far in sowing land, as four bushels of large grain.

The use of the flour of corn in furthering the process of vegetation, is to nourish the minute plant from the time of its developement till its roots are able to attract food from the manured earth; for this purpose one-tenth of the contents of a grain of good wheat is more than sufficient. The quantity of flour in wheat has been increased by culture and management calculated to improve its qualities for the benefit of mankind, in the same proportion as the pulp of apples and pears has been increased, by the same means, above what is found on the wildings and crabs in the hedges.

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* 80 grains of the most blighted wheat of the last year, that could be obtained, were sown in pots in the hot-house; of these, seventy-two produced healthy plants,—a loss of 10 per cent. only.

It is customary to set aside or to purchase for seed corn, the boldest and plumpest samples that can be obtained; that is, those that contain the most flour; but this is unnecessary waste of human subsistence; the smallest grains, such as are sifted out before the wheat is carried to market, and either consumed in the farmer's family, or given to his poultry, will be found by experience to answer the purpose of propagating the sort from whence they sprung, as effectually as the largest.

Every ear of wheat is composed of a number of cups placed alternately on each side of the straw; the lower ones contain, according to circumstances, three or four grains, nearly equal in size; but towards the top of the ear, where the quantity of nutriment is diminished by the more ample supply of those cups that are nearer the root, the third or fourth grain in a cup is frequently defrauded of its proportion, and becomes shrivelled and small. These small grains, which are rejected by the miller, because they do not contain flour enough for his purpose, have nevertheless an ample abundance for all purposes of vegetation, and as fully partake of the sap (or blood, as we should call it in animals) of the kind which produced them, as the fairest and fullest grain that can be obtained from the bottoms of the lower cups by the wasteful process of beating the sheaves.

Explanation of Plates.

PLATE III.

Fig. 1. A piece of the infected wheat straw—natural size: at *a* the leaf-sheath is broken and removed, to show the straw which is not infected under it.

Fig. 2. A highly magnified representation of the parasitic plant which infects the wheat: *a* in a young state; *b* full grown; *c* are two plants bursting and shedding their seeds when under water in the microscope; *d* two plants burst in a dry state; *e* seems to be abortive; *f* seeds in a dry state; *g* a small part of the bottom of a pore with some of the parasitic fungi growing upon it.

Fig. 3. A part of the straw of fig. 1. magnified.

Fig. 4. Part of fig. 3. at *a b* more magnified.

Fig. 5. Part of a straw similar to fig. 3. but in its green state, and before the parasitic plant is quite ripe.

Fig. 6. A small part of the same, more magnified.

PLATE IV.

Fig. 1. A highly magnified transverse cutting of the straw, corresponding with fig. 4. Plate III. showing the insertion of the parasite in the bark of the straw.

Fig. 2. A longitudinal cutting of the same; magnified to the same degree.

Fig. 3. A small piece of the epidermis of a straw, showing the large pores which receive the seed of the parasite; the smaller spots observable on the epidermis, are the bases of hairs that grow on the plant of the wheat whilst young, but which fall off when it ripens, magnified to the same degree as the preceding figures.

V. *On North American Willows, by the Rev. Mr.* MUHLENBERG, *with Notes of Professor* WILLDENOW*.

I SHALL here communicate my observations on some of the numerous species of Willow that are found in the neighbourhood of Lancaster in Pennsylvania. They may conveniently be brought under two divisions; those that flower before the appearance of the leaves, and those that produce flowers and leaves at the same time: the former might be denominated *nudifloræ*, the latter *foliofloræ* †. The following descriptions are taken from my unpublished "*Descriptiones Plantarum Lancastriensium.*"

A. foliofloræ.

1. SALIX *discolor*, fruticosa, subnudiflora, diandra, foliis ovato-lanceolatis serratis subtus glaucis, stipulis lanceolatis denticulatis, capsula tomentosa ‡.

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* Der Gesellschaft Naturforschender Freunde zu Berlin Neue Schriften. Vierter Band 1803. p. 233.

† The willows, on account of the great number of such species as exhibit no particular distinctive characters in their leaves, are of very difficult investigation. The form of the leaves, their entire or serrated margin, their pubescence or smoothness, the appearance of the catkins either with or before the leaves, are indeed characters that deserve due attention; but many species are so very uniform in regard to them, that the botanist is obliged to look out for additional marks to distinguish them with safety. A character particularly important is the form and pubescence of the pistil and capsule.

The description of the willows of North America by the Rev. Mr. Mühlenberg is a valuable contribution towards the better knowledge of this genus; for of all the species of those regions, we know but one through Mr. von Wangenheim, and another through Mr. Aiton. All that we find respecting them in the works of Clayton, Gronovius, and Walter, is too short and vague to deserve notice.—I add to this paper the characters of the species, with the figures of the leaves, which will enable the botanists to distinguish them from those already known.

‡ SALIX *discolor*, foliis glabris serratis, apice integerrimis, oblongis obtusiusculis subtus glaucis. *Tab.* 5. *fig.* 1.

This species is particularly distinguishable by the teeth of its leaves not going up so far as the points.

Caulis frutescens rarius arboreus.—*Rami* tenaces, fusci, virides, juniores pubescentes.—*Gemmæ* amentaceæ, maximæ, glabræ, univalves, bicarinatæ, glabræ. *Gemmæ foliaceæ* minores, pubescentes et virides.—*Folia* alterna ovato-lanceolata, utrinque acuta, basi integra, medio remote serrata, subtus glabra, glauca, eglandulosa. *Petioli* glabri, eglandulosi.—*Stipulæ* lanceolatæ, denticulatæ, gemma minores, deciduæ.

Amenta mascula cylindrica, tomentosa, nuda demum bifolia; squamæ ovato-lanceolatæ, apice obtusiusculæ, atræ, pilosæ; glandula baseos styliformis, apice lutea.—*Stamina* duo squama duplo longiora, alba; *antheræ* rubræ demum luteæ.—*Amenta feminea* in distincta planta; squamæ maris.—*Stylus* subquadrifidus, laciniis linearibus. *Germen* pedicellatum, cylindricum, tomentosum, glandula baseos atra, apice crenata.

Radix cortice rubro.

Habitat in aquosis. Floret Aprili.

2. SALIX *myricoides*, fruticosa, folioflora, diandra, foliis lanceolatis serratis subtus glaucis, stipulis ovatis serratis, capsula nuda *.

Caulis frutescens, 6—9-pedalis.—*Rami* glabri, virides, juniores purpurascentes.—*Gemmæ amentaceæ* majores, bivalves, nigrescentes et fuscæ, glabræ. *Gemmæ foliaceæ* fuscæ, glabræ, emarginatæ, bivalves.—*Folia* alterna, lanceolata, acuminata, obtuse serrata, glabra, subtus glauca, plana, coriacea, basi biglandulosa. *Petioli* glabri, eglandulosi.—*Stipulæ* oppositæ, ovatæ, serratæ, gemma majores, serratura glandulosæ.

Amenta mascula villosa, elongata, basi quadrifolia; squamæ atræ, villosæ, glandula baseos longa.—*Amenta feminea* in distincta planta, maris.—*Stylus* apice subquadrifidus, albus, laciniis obtusis. *Germen* pedicellatum, glabrum, glandula baseos obtusa.

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* SALIX *myricoides*, foliis glabris serratis oblongo-lanceolatis acutis basi biglandulosis, subtus glaucis. *Tab. 5. fig.* 2.

At the basis of the leaves there are, at each side of the border, one, seldom two glands: a character not observed in any other species.

Radix cortice flavescente.

Habitat in aquosis. Floret Aprili.

3. Salix *cordata*, fruticosa, folioflora, foliis lato-lanceolatis serratis subcordatis utrinque viridibus, stipulis ovatis serratis sessilibus, capsula nuda*.

Caulis frutescens, orgyalis.—*Rami* virides, glabri, basi fragiles.—*Gemmæ amentaceæ* fuscæ, bivalves. *Gemmæ foliaceæ* virides.—*Folia* alterna, lato-lanceolata, acuminata, basi cordato-sagittata, serrata, serraturis osseis, undique glabra. *Petioli* subteretes, glabri, eglandulosi.—*Stipulæ* gemmis majores, sessiles, ovatæ, reticulatæ, serratæ, serraturis osseis.

Amenta mascula nondum vidi.—*Amenta feminea* basi biglandulosa, quadrifolia, tomentosa; squamæ atræ, pilosæ, glandula baseos styliformi.—*Stylus* quadrifidus, albus, laciniis obtusis. *Germen* pedicellatum, lanceolatum, glabrum.

Habitat in palustribus. Floret Aprili.

4. Salix *rigida*, fruticosa, folioflora, foliis lanceolatis serratis rigidis glabris, stipulis reniformibus serratis petiolatis, capsula nuda†.

Caulis frutescens et arboreus mediocris; cortice viridi.—

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* Salix *cordata*, foliis glabris argute serratis oblongo-lanceolatis basi cordatis, petiolis glabris. *Tab. 5. fig. 3.*

This and the following species afford the first instance of heartshaped leaves in willows. The cordate sinus is considerable, but becomes visible only when the leaf is completely developed. Near the sinus the serratures are deeper.

† Salix *rigida*, foliis glabris argute serratis oblongo-lanceolatis basi cordatis, petiolis villosis. *Tab. 5. fig. 4.*

Rami virides superne purpurascentes, juniores villosi.—*Gemmæ amentaceæ* fuscæ, bivalves, glabræ. *Gemmæ foliaceæ* flavescentes, bifidæ, glabræ.—*Folia* alterna, lanceolata, acuminata, basi subcordata, serrata, serraturis osseis, undulata, subtus nebulosa. *Petioli* teretes, eglandulosi, pubescentes.—*Stipulæ* oppositæ, reniformes, serratæ, petiolatæ.

Amenta feminea basi foliosa, tomentosa, biglandulosa; squamæ atræ, villosæ, glandula baseos pedicellata.—*Stylus* quadrifidus, laciniis obtusis rubris.—*Germen* pedicellatum, utrinque sulcatum, glabrum.

Habitat in palustribus. Floret Aprili.—*S. cordatæ* et *triandræ* maxime affinis.

5. SALIX *nigra*, arborea, folioflora, fere tetrandra, foliis lanceolatis serratis glabris, stipulis lanceolatis serratis, capsula nuda*.

Caulis arboreus, procerus, cortice nigrescente.—*Rami* albolutei, glabri, basi maxime fragiles et dissilientes.—*Gemmæ amentaceæ* fuscæ, emarginatæ, univalves, glabræ. *Gemmæ foliaceæ* eædem.—*Folia* alterna, anguste lanceolata, acuminata, basi biglandulosa, serrata, utrinque viridia, glabra costave villosa. *Petioli* breves, pubescentes.—*Stipulæ* oppositæ, lunulatæ, serratæ.

Amenta mascula pedunculata, tomentosa, cylindrica, basi foliosa; squamæ albidæ, lanceolatæ, obtusiusculæ, apice pilosæ, glandulis baseos duabus rubris.—*Stamina* 3, 4, 5; *filamenta* barbata; *antheræ* luteæ.—*Amenta feminea: Stylus* bifidus, laciniis obtusis viridibus.—*Germen* pedicellatum, subulatum, glabrum.

Habitat ad rivos. Floret Maio.—Est *S. nigra* Marshalli, *S. vulgaris* Claytoni.

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* SALIX *nigra*, foliis glabris serratis lanceolatis, petiolis pubescentibus, floribus subpentandris. *Tab. 5. fig. 5.*

Most frequently I have found five stamens in the living plant.

6. **Salix** *longifolia* fruticosa, folioflora, diandra, foliis lineari-lanceolatis denticulatis elongatis, stipulis lanceolatis denticulatis*.

Caulis frutescens, bipedalis, fuscus. *Rami* albidi, nitidi.—*Gemmæ amentaceæ* et *foliaceæ* fuscæ.—*Folia* alterna, lineari-lanceolata, longissima, coriacea, denticulata, nitida, utrinque glabra, carina alba. *Petioli* brevissimi, glabri.—*Stipulæ* oppositæ, lanceolatæ, denticulatæ.

Amenta mascula pedunculata, tomentosa, basi foliosa; squamæ retusæ, pilosæ.—*Stamina* duo; *filamenta* squama duplo longiora, basi barbata; *antheræ* luteæ.—*Amenta feminea* nondum vidi.

Habitat ad Susquehannam. Floret Julio.

7. **Salix** *lucida*, arborea, folioflora, foliis lanceolatis serratis nitidis glandulosis demum cuspidatis, stipulis lunulatis serratis, capsula nuda†.

Caulis frutescens et arboreus, cortice albo maculato.—*Rami* fusco-lutei, glaberrimi, nitidi, basi fragiles.—*Gemmæ amentaceæ* et *foliaceæ* flavescentes, glabræ, bivalves, emarginatæ.—*Folia* alterna, lato-lanceolata, juniora obtusiuscula, adulta cuspidata, margine serrata, serraturis glandulosis, basi glandulis pedicellatis obsessa, utrinque nitida. *Petiolus* compressus, glaber, apice glandulosus.—*Stipulæ* oppositæ, sessiles, lanceolatæ, serrato-glandulosæ.

Amenta mascula pedunculata, ovato-cylindrica, villosa, foliosa, abbreviata; squamæ albæ, apice serratæ, obtusæ, basi pilosæ, pilis squama brevioribus, glandula baseos orbiculata.—*Stylus* bifidus, laciniis obtusis. *Germen* pedicellatum, subulatum, glabrum.

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* Salix *longifolia*, foliis glabris remotissime serratis linearibus acuminatis. *Tab. 5. fig.* 6.

Bears some resemblance to our *S. viminalis* with regard to its long leaves; but they are completely smooth, of half the width only, and their teeth remote.

† Salix *lucida*, foliis glabris oblongis acuminato-cuspidatis serratis, serraturis glandulosis, squamis amenti feminei dentatis. *Tab. 5. fig.* 7.

The very elongate-acuminate leaf, and the glandulous teeth, are characteristic of this species.

Habitat in palustribus. Floret medio Maii.

B. Nudifloræ.

8. SALIX *sericea,* fruticosa, nudiflora, diandra, foliis lanceolatis subserratis subtus sericeis nudisve, stipulis linearibus, capsula sericea[*].

Caulis frutescens, orgyalis.—*Rami* virides purpurascentesque, basi fragiles, apice villosi.—*Gemmæ amentaceæ* bivalves, emarginatæ, fuscæ. *Gemmæ foliaceæ* flavescentes, glabræ.—*Folia* alterna, lanceolata, acuminata, serrata, supra nitida subtus sericea nudaque. *Petioli* breves, eglandulosi.—*Stipulæ* lineares, subserratæ, deflexæ.

Amenta mascula nuda, demum foliosa; squamæ apice atræ, pilosæ.—*Stamina* duo; *filamenta* alba; *antheræ* luteæ rubræve, demum atræ.—*Amenta feminea* in distincta planta, cernua, nuda, demum foliosa; squamæ maris, glandula baseos viridi styliformi.—*Stylus* brevissimus, laciniis pallide viridibus, obtusis. *Germen* pedicellatum, ovatum, sericeum.

Habitat in palustribus. Floret Aprili.—*S. sericea* Marshalli.

9. SALIX *conifera,* fruticosa, nudiflora, diandra, foliis lanceolatis subserratis acutis subtus rugoso-pubescentibus, stipulis lanceolatis dentatis, capsula villosa[†].

Caulis frutescens, orgyali- 8-pedalis, albescens.—*Rami* apice albi, villosi hirtive, basi fragiles.—*Gemmæ amentaceæ* flavescentes, carinatæ, univalves, pubescentes. *Gemmæ foliaceæ* bi- et tri-valves.—*Folia* alterna, lanceolata, basi attenuata, integra subserrataque, acuta, supra nitida, subtus tomentosa, demum pubescentia. *Petioli* longi, pubescentes, eglandulosi.—*Stipulæ* lanceolatæ, dentatæ, apice inflexæ.

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[*] SALIX *sericea,* foliis serratis lanceolatis subtus sericeo-pubescentibus, squamis amenti germine triplo brevioribus. *Tab. 5. fig.* 8.

[†] I have given a detailed description of this species in my *Berlinische Baumzucht,* p. 347. and Mr. Wangenheim has figured it in his work: *Beiträge* &c. tab. 31. fig. 72.

It is easily to be distinguished from *Salix tristis* by the form of its leaves, their margin, and pubescence.

Amenta mascula nuda; squamæ obtusæ, atræ, apice pilosæ, glandula baseos purpurascente.—*Stamina* duo; *filamenta* alba; *antheræ* luteæ.—*Amenta feminea* sessilia, nuda; squamæ rubræ, obtusæ, undique pilosæ.—*Stylus* bifidus, laciniis obtusis, purpurascentibus. *Germen* pedicellatum, sericeum.

Habitat in glareosis. Floret Aprili. Autumno proveniunt, ut in aliis Salicibus, coni ovati, Rosæ sic dictæ Salicis.

10. Salix *tristis*, fruticosa, nana, diandra, nudiflora, foliis linearibus lanceolatis acutis integris rugosis tomentosis, stipulis linearibus, capsula villosa*.

Caulis frutescens, pedali-quadripedalis, erectus aut procumbens.—*Rami* viridi-flavescentes, tenaces, atro-maculati, tomentosi.—*Gemmæ amentaceæ* univalves, fuscæ, pubescentes.—*Folia* alterna, lineari-lanceolata, obtusa, integra, rugosa, utrinque tomentosa, superiora acuta. *Petioli* breves.—*Stipulæ* lineares, raro conspicuæ.

Amenta muscula nuda, sessilia; squamæ albidæ, apice rubræ.—*Stamina* duo, antheris purpurascentibus demum luteis.—*Amenta feminea* in distincta planta; squamæ maris.—*Stylus* bi- quadri-quinquefidus, laciniis obtusis purpurascentibus.—*Germen* pedicellatum, lanceolatum, sericeum.

Habitat in glareosis. Floret Aprili. *S. alpina* Walteri et

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* Salix *tristis*, foliis integerrimis lineari-lanceolatis pubescentibus subtus tomentosis. *Tab.* 5. *fig.* 9.

tristis Aiton videtur, nisi tristis *lavandulæfolia*. An satis distincta a *conifera?*

There are several varieties that I have not yet had an opportunity of examining, especially belonging to *nigra* and *longifolia*.

Of exotic willows several species have been planted here, which all thrive extremely well, such as *Salix babylonica*, *S. alba*, *S. purpurea*.

For the making of baskets the natives prefer *S. discolor*, *rigida*, and *lucida*.

VI. *Description of the Natural Order of Nymphæëæ*, by R. A. SALISBURY, *Esq. F.R.S. &c.*

THE botanist who laudably wishes, like the late L'Heritier, to gain more than an ephemeral reputation, should, in constituting new genera, first make himself acquainted with their *Natural Orders*, or, in other words, with the characters which unite similar genera. This axiom has scarce been sufficiently understood by the Linnean school: for, though its immortal master knew it well, the preface to his Genera Plantarum rather leads us to regard such characters as chimerical; nor was any attempt made to define them, before Jussieu published his rival work. Indeed, most of the professors of our lovely science are yet so bewitched with the *Sexual System*, that, if perchance they now and then bestow a commendation on the labours of those who study affinities, it appears more like a tacit excuse for their own utter neglect of this important branch of botany: "*sic virtus laudatur et alget.*"

The genus of *Nymphæa*, which, in all the various publications of the great Linnè, has been necessarily handed down to us nearly as described by the older botanists, is now found to contain, besides several more species, three distinct genera. These, with some others that he had no knowledge of, constitute a truly Natural Order, which belongs to the *Dicotyledones*, and I think should be placed between the *Ranunculaceæ* and *Papaveraceæ* of Jussieu. It perhaps may be distinguished as follows:

NYMPHÆEÆ.

Radix tuberosa, varie elongata stoloniferaque, perennis: fibris crassis succulentis. Stipulæ radicales, spathaceæ: vel nullæ. Folia ampla, vernatione involuta. Flores solitarii. Pedunculi axillares supra-axillaresve, scapiformes, florescentiâ peractâ submersi. Bracteæ nullæ. Calyx 4—6-phyllus, vernatione imbricatus, plus minus petaloideus, in plurimis persistens. Petala 12—30, vernatione imbricata, interiora sæpe antherifera, in plurimis persistentia: interdum nulla. Nectaria prorsus difformia. Filamenta 40—200, lata vel in paucis filiformia, exteriora haud raro petaloidea, in plurimis persistentia. Antheræ filamentis confluentes, sæpius lamellares loculis anticâ parte sitis, foveæformibus; ultra loculos varie productæ. Embryo 2-cotyledoneus plumulâ viridi, in plurimis perispermo nidulans. Receptaculum (mihi Torus), Pericarpium, Stigma, Seminaque difformia. *Herbæ speciosissimæ, pleræque lactescentes, omnes aquaticæ et sæpius natantes, quarum genera è diversa insertione et structurâ partium pendent, hucusque pauca et stabilia. Folia nonnullarum primo vere evoluta omnino submerguntur laminis inde tenuibus.*

I. MONO-

I. MONOGYNÆ.

* *Stigma placentæforme radiis tot quot loculi fructus.*

Nymphæa.

Calyx 5—6-phyllus, toro insertus, petaloideus. Nectaria 11—16, toro inserta, lamellaria, dorso mellifera. Filamenta 90—160, toro inserta, sub anthesi a pericarpio elastice dissilientia. Pericarpium superum, 11—16-loculare, in partu putrescens. Semina 140—200, parietibus sessilia, nuda. *Flores flavi, ranunculacei pedunculis crassis.*

Nomen antiquum Theophrasti.

1. Folia petiolis margine argutis. Stigma profunde umbilicatum. *Umbilicalis.*
N. lutea. *Linn. Sp. Pl. ed.* 2. *p.* 729.

2. Folia petiolis teretiusculis, laminis erectis. Nectaria longitudine staminum. *Arifolia.*
N. advena. *Sims in Bot. Mag. n.* 684. *cum Ic.* N. advena. *Soland. in Ait. Hort. Kew. v.* 2. *p.* 226. N. floribus flavis. *Clayt. in Gron. Fl. Virg. p.* 164.

3. Folia laminis elongatis, sagittato-cordatis. *Sagittæfolia.*
N. longifolia. *Mich. Fl. Boreali-Am. v.* 1. *p.* 311. N. sagittifolia. *Walt. Fl. Carol. p.* 154.
Hanc non ipse vidi.

Castalia.

Calyx 4—5-phyllus, marginem tori cingens. Petala 20—30, pericarpio a basi usque ad medium inserta. Filamenta 60—150, pericarpio altius inserta, libera. Pericarpium 12—20-loculare, in partu putrescens. Nectarium 1, centro stigmatis sessile, globosum. **Semina** 200—300, parietibus sessilia, folliculo cincta. *Flores albi, rubri, cæruleive, Magnoliarum æmuli: hos vero per noctem sub aquâ descendere certo est fabula anilis.*

Quasi ob pudicitiam, uterum totum petalis occultant species hujus generis: itaque *Castalias* dixi.

* *Laminæ foliorum usque ad petiolum fissæ.*

Pudica. 1. Folia lobis divaricatis, acuminatis. Torus medioliformis. Nectarium exsertum.

N. odorata. *Kenn. in Bot. Rep. n.* 297. *cum Ic.* N. odorata. *Dryand. in Ait. Hort. Kew. v.* 2. *p.* 227. N. alba fl. pleno, &c. *Clayt. in Gron. Fl. Virg. p.* 57.

Huic odor Anisi.

Speciosa. 2. Folia lobis approximatis, vix acuminatis. Torus cymbaliformis. Stigma breviter radiatum.

N. alba. *Linn. Sp. Pl. ed.* 2. *p.* 729.

** *Laminæ foliorum peltatæ.*

† *subtus læves.*

Scutifolia. 3. Folia laminis plus minus repandis, lobis falcato-acuminatis, basi imbricatis. Stigma 20-radiatum.

N. cærulea. *Sims in Bot. Mag. n.* 552. *cum Ic.* longe optimâ. N. cærulea. *Jard. Malm. n.* 6. *cum Ic.* N. cærulea. *Kenn. in Bot. Rep. n.* 197. *cum Ic.*

Sponte nascentem in Promontorio *Cap*, legit Franc. Masson.

Stellaris. 4. Folia laminis plus minus repandis, lobis falcato-acuminatis basi distinctis. Stigma 10-radiatum.

N. stellata. *Kenn. in Bot. Rep. n.* 330. *cum Ic.* bona. N. stellata. *Willd. Sp. Pl. v.* 2. *p.* 1153. Citambel. *Rheed. Hort. Mal. v.* 11. *p.* 53. *t.* 26.

Hanc Indicam, nec præcedentem suspicor esse plantam a Savigny descriptam.

5. Folia laminis argute dentatis, nervis subtus valde prominentibus. *Ampla.*

N. foliis amplioribus, &c. *Brown Hist. Jam. p.* 243.

†† *subtus pubescentes.*

6. Folia laminis argute dentatis. *Mystica.*

N. Lotus. *Sims in Bot. Mag. n.* 797. *cum Ic.* N. Lotus. *Blandf. in Bot. Rep. n.* 391. *cum Ic.* N. Lotus. *Pl. Rar. Hung. v.* 1. *p.* 13. *t.* 15. Ambel. *Rheed. Hort. Mal. v.* 11. *p.* 51. *t.* 26. Lotus. *Alp. Exot. p.* 214. *cum figuris.*

7. Folia laminis integerrimis. *Edulis.*

N. Coteka. *Roxb. MS. cum Ic.* fide cujus proposui.

EURYALE.

Pericarpium inferum, 12—16-loculare, in partu putrescens. Calyx 4-phyllus, pericarpio (ni toro proprio) insertus. Petala 20—30, pericarpio inserta. Filamenta 60—80, pericarpio inserta, angusta. Semina 80—100, parietibus sessilia, folliculo cincta. Nectaria nescio, centro stigmatis in exemplari Banksiano ab insectis devorato. *Flores violacei, Cinarocephalis haud absimiles.*

Nomen poeticum est *Gorgonis*, herbâ totâ aculeis pungentibus horridâ.

Ferox. 1. Folia laminis grandibus peltatis orbicularibus.

Le Lien Kien, ou Kiteou. *Mem. sur les Chinois, tom.* 3. *p.* 457.

In *Chinæ* regiones meridionales, 3000 abhinc annis aliunde introductam esse fertur.

Florescentia secundum hortulanum qui nostram legationem in *Chinam* comitatus est, sub aquâ peragitur; quod vix credam. Colitur ob radices esculentas.

II. POLYGYNÆ.

* *Stigma caudatum convexum.*

Hydropeltis.

Calyx 6-phyllus, toro insertus petaloideus. Petala nulla. Filamenta 30, toro inserta, angusta: Antheræ ultra loculos vix productæ. Torus subrotundus. Pericarpia 15—18, toro inserta, follicularia, in partu putrescentia. Nectaria nescio. Semina 1—2, parieti exteriori sessilia, nuda. *Flores cæteris minores, atro-rubri.*

Affinitas generis manifesta est, fructu tantum usque ad basin in distincta pericarpia fisso.

Pulla. 1. Folia laminis peltatis ovalibus subtus gelatinoso-pubescentulis.

Hydropeltis purpurea. *Mich. Fl. Boreali-Am. v.* 1. *p.* 323. *t.* 29. vix idonea.

Sponte nascentem in *Upper Canada* aquis, legit F. Masson.

** *Stigma orbiculare, concavum.*

CYAMUS.

Calyx 4—5-phyllus, toro insertus. Petala 16—30, toro inserta. Filamenta 90—200, angusta: Antheræ ultra loculos productæ. Torus obconicus, in alveolos tot quot pericarpia exsculptus. Pericarpia 8—30, nuciformia, usque in germinationem toro occulta. Nectarium ad latus stigmatis, glandulosum. Sem. 1. magnitudine pericarpii, absque perispermo. *Flores grandes, instar Papaverum plenorum ultra aquam elevati. Cotyledones sub germinatione inclusæ ut in Corylo, Quercu.*

Nomen antiquum et legitimum *Theophrasti* restituo, suadente carissimo Smith.

1. Antheræ ultra loculos clavatæ. *Mysticus.*

Nelumbium speciosum. *Willd. Sp. Pl. v.* 2. *p.* 1258. N. Nelumbo. *Linn. Sp. Pl. ed.* 2. *p.* 730. N. indica &c. *Herm. Par. p.* 205. *cum Ic.* Tamara. *Rheed. Hort. Mal. v.* 11. *p.* 59. *t.* 30. Bem-Tamara. *Rheed. Hort. Mal. v.* 11. *p.* 61. *t.* 31.

Floret quotannis varietas alba in Horto Kewensi, rubram autem nondum vidi.

2. Antheræ ultra loculos lineares. *Flavicomus.*

Nelumbium luteum. *Mich. Fl. Boreali-Am. v.* 1. *p.* 317. Nelumbium luteum. *Willd. Sp. Pl. v.* 2. *p.* 1259. N. Nelumbo. *Bartr. Tr. p.* 112.

Sponte nascentem in *Florida,* legit G. Bartram.

Laminæ foliorum orbiculares, cucullatæ, acuminulatæ ut in præcedente; pedunculi etiam muricati, non glabri ut vult Willdenow. Petala circiter 16, interioribus parum angustioribus.

III. SPECIES DUBIÆ HUJUSCE ORDINIS.

1. N. lutea β. Kalmiana. *Mich. Fl. Boreali-Am. v.* 1. *p.* 311. "Differt a N. lutea foliis subbiuncialibus, flore vix semiunciali. Quamvis differentiam specificam verbis notare non possim, diversa tamen videtur." *Mich.* Forsan eadem cum N. luteâ. *Walt. Fl. Carol. p.* 154. cui folia peltato-reniformia tribuit auctor.

2. N. pentapetala. *Walt. Fl. Carol. p.* 154. "Folia peltata, undique integra. Calyx 5-phyllus. Corolla 5-petala, alba. Loculi pericarpii monospermi." *Walt.*

3. N. Nelumbo. *Walt. Fl. Carol. p.* 154. "Folia peltata, undique integra. Calyx 4-fidus. Corolla multiplex, alba. Loculi pericarpii monospermi." *Walt.*

4. N. reniformis. *Walt. Fl. Carol. p.* 154. "Folia reniformia. Corolla polypetala. Loculi pericarpii monospermi." *Walt.*

VII. *On the Flowering of Zostera oceanica* Linn.[*] *by* Philip Cavolini, *of Naples.*

The plant which grows so copiously on every sandy spot between the rocks on the sea-shore, vulgarly called Sea-weed, and by the Greeks Zostera[†], bears both flower and fruit at certain periods. The flowering is indeed completed in the space of a few days, but the perfecting the fruit, and bringing it to maturity, require several months: hence botanists, though well acquainted with the fruit, have never acquired a knowledge of the flower of this plant. As an investigation which not only assists in perfecting the botanical system, but throws light upon the vegetable economy, cannot fail of being thought important, and as I have been for some years sedulously employed in this undertaking, without being able to bring it to a successful issue, till within these few days, I have thought it proper to communicate my discoveries without delay, that naturalists may not any longer remain in the dark with regard to so very common a plant.

Among the ancients, Theophrastus mentions the plant of which I am treating in the following words:—*Του γαρ φυκους το μεν εστι πλατυφυλλον τετανοειδες, χρωμα ποωδες εχον, ὃ δη και πρασον καλουσι τινες, οἱ δε ζωστηρα· ῥιζαν δε εχει δασειαν εξωθεν, ανωθεν δε λεπυρια· μακραν δε επιεικως και ευπαχη, παρομοιαν τοις κρομμυογηθειοις·*[‡] which passage I thus translate into Latin: *Inter Fucos autem est quidem ille folio lato et vittæ instar distento, habens colorem herbidum quem aliqui porrum* (πρασον) *appellant, alii cingulum* (ζωστηρα) *; radicem quidem habet extra villosam, superne autem squamatam, valde quidem longam, ac bene compactam, similem crommygethiis.* (Hist. Plant. lib. iv. cap. 7.) That by these characters Theophrastus meant to describe our plant, must be evident to any one who will take the trouble to examine it; but on the flower and fruit this author is quite silent: yet in the same chapter, after mentioning a sea oak and pine, he speaks of another acorn-bearing oak in the following words: Φασι δε τινας και αλλην δρυν ειναι ποντιαν, η και καρπον φερει και ἡ βαλανος αυτης χρησιμη. *i. e.* "It is said that there is another sea oak, which bears fruit, and the acorns are fit for use." The sea oak of Theophrastus is of that race of plants which bear no flower, but fruit or minute seeds, the cryptogamiæ of modern botanists, and is arranged under the genus Fucus; but the marine acorn-bearing oak is nowhere known: whence I conclude, from the words of Theophrastus, φασι δε τινες, that this author believed, from common report, that the fruit of our Zostera, which is sufficiently large, and of the form of an acorn (and which we shall soon see is known to our fishermen by that name), was the product of a marine oak resembling the common one.

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[*] Zosteræ oceanicæ L. Ανθησις. Contemplatus est Philippus Caulinus, Neapolitanus. Annis 1787 et 1791. Neapoli 1792, with the motto: *Quid verum curo—et omnis in hoc sum.* Horat.

Reprinted also in Usteri's Annalen der Botanik, Neuntes Stück.

[†] The Ζωστηρ was πολεμικον σκευος, properly the girdle surrounding the whole armour. *Vide Hom. Iliad.* δ. v. 132. 215.

[‡] Some remarks should be made on the readings of this passage. Gaza has omitted τετανοειδες, a necessary word, denoting the situation (form?) of the leaf, which he had called broad, relatively to a similar plant with a grassy

From Theophrastus to Tournefort, hardly any botanist

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grassy root, of which he was afterwards to speak. I have also restored the old reading ανωθεν, instead of εσωθεν or ενδοθεν, notwithstanding the former has been condemned by Gaza, Scaliger, and Dalechamp; for the root of Zostera (or rather the trunk), pubescent below, and hairy from the shedding of the old leaves, is scaly above from the remains of leaves: and it would appear contradictory in Theophrastus, if he had called the interior of the root scaly, which he presently after says is ευπαχη, compact. What is meant by γηθυον, Theophrastus has himself explained Hist. lib. 7. ch. 4. viz. a plant of the onion tribe, very near to the leek, having a long neck: thus, having first defined the parts of Zostera, he proceeds to compare the habit.

has made mention of this plant. Lobel (Advers. p. 471.), Dalechamp (Hist. Gen. Plant. part 2. p. 1373.), and John Bauhin (Hist. Plant. t. 3. 2. p. 794.), have given a slight description, with a miserable figure of it; and it is mentioned by Tournefort as a plant bearing neither fruit nor flower (Inst. R. H. p. 565. 569. tab. 337.). Ant. Vallisneri is, I believe, the first who has inquired more accurately into the fruit pointed out by Theophrastus. This author, being a great enemy to the opinion of equivocal generation, sought every means of overthrowing that doctrine, by examples collected both from the animal and vegetable kingdoms, and with the happiest success. The Zostera being vulgarly thought to derive its origin from putridity, an opinion assented to by men so well acquainted with botany and physics as Morison and Buonanni, Vallisneri, through his friend Hyacinth Cestoni, procured the fruit of Zostera from the Leghorn coast, and both described and figured it (Operum vol. 1. p. 215.), but was no way solicitous about the flower.

When Linnæus published his Sexual System he was not acquainted with the inflorescence of Zostera, either from his own observation or that of others, but framed the generic character from Moehring's description of a plant under the name of *Ruppia aquis marinis innatans*, (Philosophical Transactions for the year 1741, p. 217.—a plant of which I am still doubtful), inserting it in Gynandria Polyandria. Of this genus he made Moehring's plant a species under the name of *Z. marina*, and afterwards (Gener. Plant.—Mant. 1. p. 123.) added our common Zostera as another species by the name of *oceanica*.

Thus matters stood in the year 1790, when the celebrated A. L. de Jussieu (Gen. Plant. Paris. 1789. p. 24.) enumerated it among his Aroideæ; and N. Jos. de Necker in a work published soon after (Elem. Bot. v. 3. p. 295. Neowed. 1790.) retained the same characters.

About the year 1786 the fame of the discoveries of Hedwig in the cryptogamic plants, especially in the family of mosses, by which he attempted to establish the existence of fecundation universally in the vegetable kingdom, excited in me a strong desire to see his works*; which having obtained, I soon found that the principal part of the discovery consisted in explaining the mechanism of the spermatic thecæ (viz. of those bodies which had been detected by Micheli in the Mnia), by which they shed a copious pollen (i. e. vesicles containing sperm, prepared to burst on touching the stigma) for the impregnation of the female organs. But in the preface to the second part of his work on mosses, Hedwig ingenuously confesses that the matter issuing from the thecæ is the pure sperm, and not the vesicles containing it, like the pollen of larger plants. To the proper action of this sperm there appeared, however, to arise great impediments, not only from the distance at which the stigma is frequently placed, but also from the moist air, and even water, in the midst of which the fecundation was sometimes necessarily to be effected; a difficulty he sought to obviate by bringing analogous examples in the animal kingdom, as in the spinous fish, in frogs, and other amphibiæ (Fund. Hist. Nat. Musc. P. 1. p. 67. 69.). From this time I began to consider whether a similar argument could not be drawn from the vegetable kingdom; but examples were in vain sought among the fresh water plants, as all of these, though entirely submersed at other times, in the season of fecundation raise their flowers above the surface. I had more hopes from the marine plants; but all of these, as far as I knew them, were cryptogamous, except indeed *Zostera*, which therefore I resolved to subject to a more accurate examination.

I began in the spring to turn over the Zosteras in our bay, and continued to do so through the summer, I also inquired of the fishermen, especially of those employed in taking Echini, which feed in such quantities amongst the Zostera, what they knew of the flower or fruit of this sea-weed. From them I learned that it produced fruit of the size of olives in some seasons, but not at regular periods; and that in those seasons not only the Echini, but the Tunnies also, which they falsely suppose to feed upon these olives or acorns as they called them, were found in greater abundance in our bay than in other years. A diver whom I had been used to employ in collecting polypi and other things at the bottom of the sea, in the beginning of October 1787, informed me that in the bay of Trentarimmi, between Euplæa and the Island of Nesis, he had found sea-weeds with spikes like pinks. The violent stormy weather prevented my visiting that spot till the 18th, when I examined the spiked weeds in every part; but in all the fecundation was entirely completed, the germen had attained a considerable size, and the surrounding leaves were for the most part worn off. The stalk gradually enlarged, and in the course of the winter the fruit acquired the size of olives, and in the spring, being quite ripe, fell off, swimming on the surface of the water by means of their pulpy pericarp. As this pulp decayed, the large seed, of the shape of an almond, being heavier than water, sunk to the bottom, and became fixed in the sand between the rocks.

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* Fundamentum Historiæ Naturalis Muscorum. Lipsiæ 1782. et Theoria Generationis et Fructificationis Plantarum Cryptogamicarum. Petropoli 1784.

From the year 1787 to 1791, towards the end of summer, and through the autumn, I examined the Zosteras, both in this place and every part of the bay, in hopes of finding them in flower, but in vain, till on the 8th of October of the last-mentioned year, when wandering along the bay, still indulging the hope of finding the long-sought flower, I espied a spike not unlike that of grass floating on the water, which having opened, I perceived it to belong to Zostera, and to contain the rudiments of the flower not nearly come to perfection. Continuing my research in several other places, as far as the extreme point of Pausilypi, I found most of the plants bearing spikes, the flowers of which as yet lay concealed in the hooded involucra formed by the leaves; the anthers being green, and the pistils scarcely protruded. I determined to examine the plants again three days after; but the wind blew so hard from the south, and the weather was so rainy, that I could not revisit the place before the 14th, when upon examination I found the flowers in various degrees of maturity; some still lay concealed in the leaves, others, further advanced, were protruded from the involucra, and in many the anthers ejected plenty of pollen.

The inflorescence was as follows. From the centre of the leaves arose a scape growing out into a spike, consisting of four spikelets of flowers, sometimes only three, each spikelet bearing usually (and the terminal one always) three flowers growing close together. The flower has six large oblong anthers, attached their whole length to the base of the corolla on the outside; a singular insertion unknown in any other plant. Thus the corolla consisting of three petals, and bearing its anthers without, immediately surrounds the pistil and its hairy stigma: but in the terminal flower the pistil was either wanting, or, if present, was steril. Upon subjecting the pollen in water to a microscope of great power, I found it different from that of other plants, being oblong like little eels, which, with a sudden and brisk motion, exploded and scattered their sperm in the twinkling of the eye. I observed that the upper male flower sometimes came more early to maturity, and assisted in the impregnation of the two subjected flowers, as their ovaries showed evident signs of being fecundated before their proper anthers were burst. All the spikes had escaped from their spathe-like involucra before this period, so that the fecundation must necessarily have been effected in the open water.

After several stormy days, on the 25th of October, the weather being again serene, I went in a boat to revisit my Zosteras, and found the germens in all fecundated; the remains of the anthers adhered to the petals, now become thicker, and enveloping the pistil; the hairy stigma was turned black. In the terminal flowers the anthers had all shed their pollen, and remained in a shrivelled state; the petals were slightly rolled up; and in not a few instances the terminal flower had entirely disappeared, and one of the lower ones, overtopping the other, had taken its place. The two lower flowers were much advanced, the germen being much larger, the stigma black and shrunk. Upon opening the germen lengthwise, the seed was seen as it were within an arch and unconnected with the upper part; the cord of tubes proceeding from the stigma to the seed and which I had before seen entire, being now broken.

On the 3d of February 1792, I again visited the Zosteras which I had left at the end of October with their fruit fecundated. I found, however, very many of the flowers had proved abortive; the few germens that had proceeded towards maturity were now enlarged to half the size of an acorn. On dissecting these longitudinally the very tender seed was found adhering to one side, and at every other part considerably distant from the sides of the cavity. The corculum of the seed (ἡ αρχη του σπερματος) which would afterwards fill the remainder of the cavity, was to be evolved in the very womb of the mother plant.

About the end of March I again examined the fruit, and now the seed entirely filled the cavity of the pericarpium, and was so far evolved, that the gemma was easily separated from its cotyledon, and the connexion of the latter with the surface of the pericarpium was now dissolved. The gemma was so much enlarged, that at the apex it extended into leaflets, and at its base, by which it had before adhered to the cotyledon, the roots, as yet invisible, were protruding. That part of the gemma which has a longitudinal furrow, and at which it formerly adhered to the base of the cotyledon, was still applied to the latter. In the mean time the cotyledon diminished in proportion as the gemma was increasing; so that when the seed was perfectly ripe, the former was dried up like chaff, and lay in the concave side of the gemma, much in the same manner as happens to the yolk in an incubated egg. What appeared to me a phenomenon perfectly new is, that the germ should be evolved in the womb of the mother plant, in the same manner as in viviparous animals, that perfect the fœtus in the uterus, and discharge it by the separation of the placenta. It is to me a very flattering reflection, that the arguments proving an analogy between one class of animals, and an order of vegetables, thus by nature indissolubly connected, should be drawn from one of the most common of plants *.

Towards the end of spring the ripe fruit of the Zostera floated on the water, and all the pulp of the pericarpium being soon dissolved, the seeds, specifically heavier than water, and far more compact than those of acorns, sunk to the bottom, and remained fixed in the sandy shoals between the rocks.

The farther evolution of these I have endeavoured to trace, by planting in pots filled with sand, on the 7th of May, seeds taken from the floating pericarps. Tying a linen cloth over the mouths of these pots, I immersed them in the sea. Five days after I examined the pots, and found the seeds vegetating beautifully, the upper extremity

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* Something similar may be seen in the seeds of several other plants, such as [illegible]; but the analogy above alluded to does not hold good.—Ed.

having shot out into leaves about four lines long; and at the base of the convex side, sometimes to the right hand and sometimes to the left, was seen a projecting whitish knob, the rudiment of the future roots: this knob was likewise protruded in the seeds which still remained in their pericarpia, and which were thrown out about the middle of the month.

On the 19th of May I again examined the pots, and now found the leaves of the gemmæ grown longer, and the root emerging from the knob, the epidermis being burst, nor were there any other signs of root in any part of the body of the gemma.

Such was the beginning germination of the seed: the gemma soon passed into stalk, throwing out roots and branches from every part. This having been observed by the celebrated Vallisneri (Operum, v. 1. p. 216. in fine.), affords an argument that he had some tolerably clear notions of what we have remarked of this viviparous plant.

From the above observations it will not be difficult to give a description of our plant in the Linnean manner, which it is evident can no longer remain with Gynandria Polyandria, but must be removed to Hexandria Monogynia, and belongs to the natural order of Calamariæ of Linnæus.

Z. oceanica L.

Radix multiplex, tenuis, teres, ramosa, palmaris.

Caulis subteres, sublignosus, lentus, ramosus, repens, squamis veterum foliorum vestitus, perennis.

Folia ex ramorum apicibus erumpentia, sibi parallele incumbentia, longissima, plana, linearia, membranacea.

Scapus angustior, linearis, crassiusculus, e foliorum centro enatus, sustinens spicam disticham coarctatam, complanatam.

Flores in spicis partialibus, sæpius terni, rarius bini (laterales bini pedicello vix elevato).

Singulæ

Singulæ spicæ.

Calyx exterior: Spatha bivalvis; valva exterior longissima, ligulata, basi appendicibus binis stipuliformibus oblongo-ovatis, amplexantibus: valva interior retusa, emarginata, membranacea, suis appendicibus amplexantibus non longior.

Calyx interior: Spatha bivalvis, valvis subæqualibus, ligulatis, subacutis, basi appendicibus quoque amplexantibus.

Spica e centro assurgens, rachi subtereti, flores numero terno sustinens, binos alternos, reliquo terminali.

Singulus Flos.

Antheræ sex teretes, oblongæ, sessiles, adpressæ, erectæ, medio affixæ margini receptaculi, per longitudinem dehiscentes, sub maturatione rubescentes, et copiosum pollinem lanæ instar gossipinæ emittentes.

Corolla antheris interior (an nectarium?). *Petala* tria profunde concava, crassiuscula, aristata, pistillum amplexantia, ad maturitatem seminis persistentia.

Germen teres, corolla vix longius: *Stylus* brevissimus, *Stigma* crinitum.

Pericarpium ovatum, pulposum (semine maturo deciduum).

Semen gemma nuda, oblongo-ovata, altera parte convexa, altera sulcata: *cotyledone* in sulco recondendo.

Obs. The pistil is always wanting in the terminal flower of the spike, and in its place is generally a horn-like appendage, rising from the margin of the receptacle, and standing erect between the anthers; and the internal petal of the corolla is rolled up, for want of being supported by a pistil: in the centre, in the place of the pistil, is a mere thread or wasted filament.

In the third spike, the internal valve of the internal calyx is very short, membranous, and concave. The terminal flower is wanting, and in its place is often a little horn, standing between the other two flowers, one of which is

also sometimes wanting, and then there is only a solitary pedicled flower.

In the second spike too, now and then, but not often, the terminal flower is deficient.

In the terminal spike, the external calyx never has any internal valve. The universal spike therefore sometimes consists of four, sometimes of three, and now and then of two spikelets.

Thus we have a plant the flowers of which are fecundated beneath the water; an unusual case, and contrary to a received law among botanists. Theophrastus remarks (De Causis Plant. l. 2. c. 3.), that constant showers during the season of flowering (περι τας ανθησεις), are the cause of the flowers perishing and falling off without producing fruit; and in a long commentary on the Egyptian Lotus (Nymphæa Lotus Linn.), growing in the Euphrates, has observed that its flowers withdraw beneath the water during night, return again at the break of day, and, when fully expanded, stand high out of the water (Hist. Pl. l. 4. c. 10. De Causis Plant. l. 2. c. 26.): an argument which Linnæus has made use of in confirmation of the sexes of plants*.

The causes that occasion the pollen to be washed off, and prevent its being retained long enough to explode upon the stigma, are, 1st, its spherical or oval form, through which it will readily roll off with the water; 2ndly, the anthers being generally raised upon filaments, and at a distance from the pistil; and, lastly, the stigma being rarely hairy or feathery. But in Zostera it is evident that these causes are obviated; for the terminal flower in each spike except the third is intended to serve no other purpose but to im-

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* Flores submersi ascendunt sub florescentia: Nymphæa, Stratiotes, Myriophyllum, Potamogeton, Hydrocharis, Vallisneria. So says Linnæus; but whether this be universally true requires further examination.

pregnate the two subjected female flowers, which are placed at a short distance, and no impediments intervene, as these anthers are inserted on the outside of the corolla, and, as I have before observed, arrive more early at maturity than the proper anthers of the flower. Besides, their bulk is such, that, when burst, the surrounding water is so entirely filled with the pollen that some of the particles must necessarily attach themselves to the stigma: this process must be still more certain from the proper anthers of the flowers, which are so close to the stigma as almost to touch it. The sufficient detention of the pollen upon the stigma is further assisted by its oblong eel-like form, by which it is more readily entangled among the hairs of the stigma, and retained till it explodes and discharges the sperm.

The pollen is a collection of vesicles containing the fecundating lymph, to which an elastic aura tenaciously adheres, the force of which increases as the pollen arrives at maturity. It is only now required that the resistance to its escape should be overcome by its power and action, which is effected by the softening of the coats of the vesicles: then the pollen moves in the water, the vesicles explode, a visible lymph is discharged, and the invisible expansile aura escapes. This vital aura, absorbed through the ducts, is conveyed to the germen, where it again becomes fixed, and remains inert, till the ripened seed be committed to the cherishing moisture, or the warmth of the earth. I do not know if any one has scrutinized into the nature of this lymph; what has been lately done by Koelreuter and Necker, is unknown to me, as their writings, chiefly in the German language, rarely reach us. That this aura, contained in the arteries of animals, constituted animal life, was the doctrine of the Greek physicians, which M. Rosa has lately endeavoured to confirm by a long course of experiments. That it is found in the sperm of animals, I have established by many experiments, and that it is not destroyed by the admixture of the lymph with water, but nevertheless performs its office, is evident from this, that in various animals, such as frogs, water-lizards, and spinous fishes, as well as in our Zostera, the eggs, invested with their proper membranes, are impregnated under water by the sperm being poured out upon them.

With respect to Moehring's plant, the *Zostera marina* of Linnæus, I have nothing certain to state at present. I supposed this to be the plant which grows so plentifully in the sandy spots of our bay, especially on the Olympian shore, familiar to our fishermen, and well described by Theophrastus (Hist. Plant. l. 4. c. 7.) as having a reedy stalk, a geniculated obliquely creeping root, like grass, and much smaller than Zostera. But as I know nothing of its fructification, I am not certain whether it should be referred to Zostera, or to Linnæus's genus Ruppia, for which the characters of Moehring must be adopted; I therefore defer giving any account of this until I shall be so happy as to find its fructification. It is my intention to compose the history of all the fuci, corallines, and other genera found in our bay, as yet unknown to naturalists, as well as of the Polypi and other Mollusca, which last I hope soon to complete. By these labours I trust I shall deserve the good will of my fellow-citizens, my first object, and the thanks of many friends of science.

Explanation of Plate VI.

Fig. 1. *Zostera oceanica* in flower. A branch hairy below, above scaly, with the scape supporting the universal spike—*a.* the lower partial spike with flowers emerged from the spathe;—*b.* the second spike not yet developed;—*c.* the third spike still backwarder;—*d.* the terminal spike with flowers emerged.

2. A partial spike not yet developed—*a.* common peduncle

sustaining the spikes;—*b.* the longer valve of the exterior spathe;—*c.* the shorter ditto;—*d. e.* the two valves of the interior spathe;—*f. h.* the unripe anthers of the lower and upper flower;—*g. k.* aristæ of the petals.

3. A flower of a spike not yet evolved—*a.* pedicle supporting a spikelet;—*b. b.* two opposite anthers inserted into the margin of the receptacle, and adhering to the petal at the point *m.*;—*c.* pistil with the stigma.
4. A partial spike developed—*a.* the pedicle;—*b.* anthers beginning to open;—*c.* aristæ of the petals;—*d.* pistil displayed;—*e.* stigma;—*f.* old anthers;—*g.* the little horn in the place of a pistil;—*h.* aristæ of the petals.
5. Third spikelet evolved—*a. b.* two lower flowers;—*c.* little horn in the place of the terminal flower.
6. The same spikelet with anthers taken off—*a.* flower without the anthers;—*b.* the same deprived of the anthers and two petals.
7. An unripe pistil dissected longitudinally and magnified—*a. a. a. a.* hairy stigma;—*b. b.* ducts from the stigma to the germen *c.*
8. Spikelet with fecundated flowers—*a.* base of the spikelet to which the spathes adhered;—*b. d.* anthers opening and discharging pollen;—*e.* stigma of a fecundated germen which is seen at *fig.* 9.;—*m. m.* the exuviæ of the anthers;—*n.* remains of the warted horn;—*o. o.* petals rolled up.
10. The pollen magnified, skipping in the water, and exploding.
11. Pericarpium with the seed fixed to one side.
12. Gemma separated from the cotyledon, as at the end of March—*b.* the point at which it adhered to the cotyledon;—*a.* apex protruded into leaflets.
13. The pericarpium dissected lengthwise, with the adhering cotyledon, *a. b.*;—*b.* the base of the cotyledon

to which the gemma, fig. 12., is affixed, and applied along the furrow.

14. Pericarpium ripe and opening parting with the gemma.

15. Ripe gemma—*a.* the base, from the opposite side of which the root is to be produced;—*c.* leaflets much increased;—*d.* the furrow in which the shrivelled cotyledon is concealed; *b.* the convex side.

Addition to M. CAVOLINI'S *Treatise on Zostera oceanica* L.

THE foregoing treatise of M. Cavolini, while it bespeaks a spirit of exact and persevering inquiry, throws light upon a plant till then completely wrapped up in obscurity; for though there exist of it, besides some doubtful figures, a representation in Vallisneri Opera, and another in a work of Micheli, yet the former is too imperfect, and the latter contained in a series of plates never published*. From those figures, particularly from that of Cavolini, and his complete (though not always quite correctly worded) description, it clearly appears that the plant in question has no relation whatever to *Zostera marina*, nor, indeed, even any distant resemblance except in its leaves, organs which we all know often to be, or at least to appear, uniform in vegetables of the most distant tribes.

The error that coupled these two plants together is briefly this: Linnæus constituted his genus Zostera from the common grasswrack, so copious on the shores washed by the North Sea and the Baltic, and first proposed its character in his instructive *Wästgöta Resa*, where he also refers to the complete description given by Möhring of what this botanist called *Ruppia foliis linearibus obtusis* (Philosophical Transactions, 1741. p. 217.), and which is certainly the same plant with *Zostera marina*. This species was the only one taken up by Linnæus in his Species Plantarum, till M. Gouan, then a young botanist, pointed out another found by him in the Mediterranean, and distinguished by the title *Zostera pericarpiis pedunculatis olivæformibus*. As this naturalist quoted a figure of Lobel which represents leaves not unlike those of a real Zostera, it is much less surprising that Linnæus should have taken it up from the authority of the Flora Galliæ Provincialis, than that Gouan, who referred for the generic character of his plant to the Wästgöta Resa, and hence was probably not unacquainted with the figure given in that work of the original Zostera, should add as a congener of it a plant of the difference of which he had the best opportunity of convincing himself.

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* A copy of it, with a MS. title, in the Banksian library, contains, in 60 plates, well executed figures of mostly corals and zoophytes, with a few submersed marine plants. Vid. *Dryand. Cat. Bib. Banks.* vol. i. p. 197.

Cavolini, in describing the latter aquatic, was unacquainted with the original plant from which Linnæus had constructed the genus, but some time after had an opportunity of observing, likewise in the Mediterranean, a plant which is a true Zostera, though certainly not the same species with Z. marina, as he seems to suppose: of this he gave a description in a subsequent paper, calling it *Phucagrostis Theophrasti minor*, a temporary name, for which he leaves it to other botanists to substitute a better one, while he reserves that of Zostera for the plant described by him in the foregoing paper. As, however, such interchanges of names ought not to be tolerated in botany, it is proper to reinstate the original Zostera in its rights, and to give a new name to the other; and, indeed, it could have borne none with greater propriety than that of its original describer, had not the name of *Caulinia* been affixed by Professor Willdenow to another genus described in this volume.

There is in the Banksian Herbarium, under the name of *Thalassia*, the male plant of a diœcious genus, which in its habit approaches so near to Zostera oceanica of authors, that at first one might be induced to consider them as congeners, and consequently to unite them under that very suitable appellation: a closer examination, however, proving them to differ in those organs that determine generic distinction, they ought to be kept separate as two genera; we therefore propose for the latter plant the name of *Posidonia*.

Having mentioned *Thalassia* of Dr. Solander, it will not be thought improper to give here a short description of it, taken partly from the Banksian manuscripts, and partly from a specimen in spirits; but we regret not to have had an opportunity of seeing the female plant. In the habit it is intermediate between Zostera and Posidonia. Its leaves, of which generally only a few are perfect, the rest being the short remainders of preceding ones, are all radical, linear, very smooth, membranaceous, transparent, and entire except towards the rounded top, where delicate teeth or ciliæ are observed; they are from three to five lines broad, above five inches long, longitudinally striated with about twelve delicate parallel nerves, from each of which run to the other still more delicate transversal ones as so many bars, forming square areæ, each furnished with short striæ or dark-coloured dots.—From the axils of the leaves issue one or two (seldom three) scapes exceeding a line in thickness, two or three inches long, running out into a spathe, half an inch long, and divided into two laciniæ, which are three lines broad, linear, erect, oblong, obtuse, smooth, and irregularly serrulated at the margin. In this spathe is contained a single pedicled male flower, destitute of a corolla, but furnished with a triphyllous calyx, whose leaflets are ovate-oblong, very concave, obtuse, entire, smooth, and nearly half an inch long. Within these, and fixed to their base, are nine sessile linear-lanceolate anthers, of nearly the length of the calyx, standing upright closely together.

It is evident from this that Thalassia is widely different from Posidonia; but there is another marine phænogamous plant described by the same M. Cavolini in the abovementioned dissertation under the name of *Phucagrostis Theophrasti major*, which, at least in regard to habit, in being diœcious, and in the structure and situation of the anthers, approaches very near to the former genus; we shall therefore give here the substance of Mr. Cavolini's description of it, accompanied by his figure.

The male plant was found by that botanist in great abundance in the bay of Naples, June 9, 1792. Its stalk (which to judge from the figure might perhaps be more properly considered as the root) is perennial, rather woody, creeping, flexuose, articulated, emitting at each joint filiform roots. The shoots (called branches in his description), likewise rising from each joint upwards, are annulated towards the base, and bear linear, obtuse, membranous leaves, whose bases forming flat sheaths, closely cover each other. From these sheaths rises a long attenuated pedicle or scape (called filament by the same describer), nearly of the same length with the leaves: it is divided at the top either into two or four parts, to which are attached lengthwise four anthers in pairs, so as to leave a space at the two opposite sides: they open longitudinally, discharging a white capillary pollen, which covered for a great space the surface of the water around, and had, before it arrived at maturity, been a pretty compact mass. On the 25th of the same month all the flowers had disappeared.

The female plants he did not discover before the 24th of June, when the ovary had already begun to swell, and there were comparatively but few of them. Their flowers had nearly the same situation as the male: they were likewise destitute of calyx and corolla, and consisted of two ovaries, flat inside, convex at the back, fixed to a short peduncle, and each lengthened out into a filiform style an inch long, separating into two filiform stigmas, longer than the style, of a dark yellow at the upper part, and tubular when seen through a microscope. In about five weeks the fruit (or naked seeds), supported by the small pedicle, had arrived at maturity; they were roundish, compressed, with elevated margins, and furnished at the top with a point, the vestige of the style; their covering, rather woody with a thin pulp, consisted of two opposite valves, with a third surrounding and joining the margins. The embryo was covered with a thin membrane, much compressed, convex on one side, where was lodged connate with it the plumula, of a cylindric form and reddish colour.

This new genus, in opposition to his *Phucagrostis Theophrasti minor* (Zostera), M. Cavolini has called *Phucagrostis Theophrasti major*; but as this name may rank, in botanical nomenclature, with "*planta innominata*" and similar denominations, that of *Cymodocēa* is proposed in its stead.

Thus much being known of three new genera, two of which have been the cause of frequent confusion, they may perhaps be established thus.

POSIDONIA.

Spatha duplex bivalvis. *Calyx* et *corolla* desunt. *Stamina*, filamenta tria hypogyna, petaloidea, ovato-acuminata, persistentia, singula biantherifera; *antheræ* filamenti lateri exteriori adnatæ, *pollinem* filamentosum secernentes. *Ovarium* longitudine staminum, ovatum: *stylus* vix ullus: *stigma* villosum. *Pericarpium*, nux ovata pulposa.—*Folia radicalia vaginantia; flores bispathacei, ratione situs partium hermaphroditi, ratione fructificationis*

tionis processus monoici et dioici. Anne rectius filamenta nuncupanda quæ Caulino petala?

Posidonia Caulini.—Zostera pericarpiis pedunculatis olivæformibus *Gouan Fl. Gallo Provincialis. p.* 121.—Zostera oceanica *Linn. Mant.* 1. *p.* 123.—*Caul. Monogr. cum tab.—Tab. nob. vi.*

CYMODOCEA.

Dioica. *Calyx* et *corolla* O. MASC.—*Stamina* O; *antheræ* quatuor lanceolato-acuminatæ, scapo superne bi- s. quadrifido affixæ, erectæ, conniventes, pollinis massam solidam maturitate filamentosam foventes. FŒM. *Ovaria* duo subsessilia, convexo-plana, approximata; unicuique *stylus* filiformis cum *stigmatibus* duobus subulatis. *Pericarpium*, capsulæ geminæ, approximatæ, compressæ, bivalves, valvulis annulo ambiente conjunctis. *Planta marina habitu Posidoniæ. An quod scapus nobis cum Caulino stamen vocandum?—An genus vere dioicum?*

Cymodocea æquorea.—Phucagrostis Theophrasti major *Caul. Monogr. cum tab.—Tab. nob. vii.*

THALASSIA. MS. Banks.

Dioica. MASC. Spatha uniflora, monophylla, bifida: laciniæ oblongæ, obtusæ. *Calyx* triphyllus: foliola ovato-oblonga, obtusa. *Cor.* nulla. *Stamina, filamenta* nulla: *antheræ* novem, lineari-lanceolatæ, calice breviores, conniventes. FŒM.....

1. *Thalassia testudinum* foliis sessilibus obtusissimis multinerviis, stipite descendente radiculas exserente.

Alga foliis fere linearibus. *Brown Jam. p.* 71.

Alga angustifolia vitrariorum. *Sloan. Jam.* 5. *Hist.* 1. *p.* 61.

Habitat in oceano Indiæ occidentalis ad litora Antiguæ.—Henr. Smeathman.

2. *Thalassia ciliata*, foliis sessilibus retusis multinerviis, stipite descendente vaginis imbricato.

Zostera ciliata, stipite viridi, vaginis imbricato, foliis distichis, apice retusis, ciliatis margine et ejus basi amplexantibus folia superiora. *Forsk. Descript. p.* 157.

Z. ciliata, foliis confertis retusis ciliato-serrulatis. *Vahl Enumer. p.* 15. *n.* 3.

Habitat in Mari rubro ad littora Mocchæ. Forskâhl.

3. *Thalassia stipulacea*, foliis petiolatis obtusis trinerviis, nervis lateralibus marginalibus.

Zostera stipulacea, stipulis oppositis oblongis complicatis, foliis geminatis oblongo-lanceolatis petiolatis. *Forsk. Descr. p.* 158.

Z. stipulacea, foliis geminatis petiolatis, stipulis oppositis conduplicatis. *Vahl Enumerat. p.* 15. *n.* 4.

Habitat in Mari rubro prope desertum Sin. Thomson—prope Moccham. Forskâhl.

Though we are not quite certain whether the two latter species really belong to Thalassia, or to one of the two foregoing genera, yet even the specimens without fruit prove that they are not congeners of Zostera, from the want of any observable fructiferous slits in the leaves.

C. K.

Explanation of Plate VII.

Fig. 1. A male plant of Helice.
  a. The flower still hidden within the sheath of the leaf.
  b. The same in its developed state, with anthers ready to emit the pollen.
Fig. 2. A flower taken out of the sheath with anthers still adhering to each other.
Fig. 3. The anthers opened, exhibiting the masses of pollen.

Fig. 4. The pollen, consisting of filiform thecæ highly magnified.

Fig. 5. A female flower.

a. The two ovaries.

b. The styles.

cc. The stigmas: * the place where they begin to be of a yellow colour.

Fig. 6. Fruit arrived at maturity.

Fig. 7. The seed taken out of the integument, but still covered by its membrane.

Fig. 8. The same with the membrane removed to show the situation of the plumula.

Fig. 9. A young plant shooting up from the seed.

VIII. *Description of several new Species of Oak, from the Spanish of Don* LUIS NEE.

WHEN giving on another occasion some account of Michaux's useful work on the oaks of North America, we likewise made honourable mention of a paper descriptive of several new South American species, inserted in that interesting periodical work published at Madrid, the *Anales de Ciencias naturales, tomo ii. n.* 9. As scarcely any genus of trees merits greater attention than that of Quercus, we think it incumbent on us to make our readers better acquainted with the contents of this paper. After speaking on the culture of the oak in general, and the little of attention paid to it in Spain and in other countries, the author enumerates the following species as indigenous to Spain.

1. The cork-tree (*Quercus suber* L.), El Alcornoque.—The acorns of this species are of an inferior quality to those of the common evergreen oak (*Quercus Ilex* L.); but the tree is desirable on account of its bearing three crops of

acorns every year, distinguished in Estremadura by the names of *brevas*, *medianas*, and *tardías*. The *brevas* are fit to be gathered for feeding hogs a fortnight before those of Quercus Ilex; the *medianas* ripen two weeks later; and the *tardías*, though upon the whole smaller and of different quality, last till the month of February. Thus the husbandman has the advantage of procuring fresh provender as early as the months of December and January. Probably the flowers are also produced at three different periods, as those of the carob-tree are at two. The cork-tree possesses the further advantage of growing in such barren ground as the evergreen oak will not thrive in.

2. The kermes-oak (*Quercus coccifera* L.), La Coscoja. There is a very low shrubby variety of this, much relished by the goats. The cochineal or kermes (*Coccus Ilicis* L.) is found on both kinds; in the low variety, on the leaves only, and not on the stem, but in the other on the branches. The calyx of this species is covered with stiff diverging hairs.

3. The Valencia-oak—*Quercus valentina* of Cavanilles, who has described and figured it in his *Icones, vol. ii. tab.* 129.—El Roure de Valencia.

4. The common oak (*Quercus Robur* Linn.)—El Roble.

5. The *Quercus racemosa* of Lamarck.

The two last species exceed the others in height, and are preferred for ship-building. The name of *Roble* is applied to several trees which, though very different from the oak, resemble it in the solidity of the wood: thus in San Carlos de Chiloe it is given to *Eucryphia cordifolia* of Cavanilles; in Guayaquil to *Bignonia cœrulea* Linn. &c.; and at Botany Bay, the species of *Banksia* described by Cavanilles under the name of *Banksia robur*, was generally called roble or oak by the carpenters of the Spanish frigates.

6. The common evergreen oak (*Quercus Ilex* L.)—La Encina commun.—There are several varieties of this spe-

cies in Spain, differing from each other in the form of their leaves and the shape and taste of their acorns. One often sees in the same wood, trees with entire, ovate leaves, two inches long, others with short lanceolate-ovate, entire, and others again with very small toothed leaves. The fruit in some is more or less ovate, sometimes cylindrical, from one inch and a half to two inches long, and of a sweet taste; in others the acorns are much smaller, very tender, and in taste somewhat like hazel-nuts. In general this species attains a less height than the common oak (*Q. robur*), but now and then is very lofty, a single tree yielding as much as 20 bushels (*fanegas*) of acorns. Its very hard and solid wood is used for making the spokes and fellies of wheels.

7. The Turkey oak (*Quercus cerris* Linn.)—El Rebollo.—The cup of the acorn is covered with a bristly pubescence.

8. The prickly-cupped oak (*Quercus muricata* Linn.)—El Quexigo.

9. The great prickly-cupped oak (*Quercus Ægilops* Linn.)—El Egilope—Remarkable for the extraordinary size of the cups, which are an inch in depth, and more than two inches in circumference.

Description of the new exotic Species of Oaks.

1. QUERCUS MICROPHYLLA.

Quercus caule fruticoso: foliis lanceolatis, subtus tomentosis, limbo revoluto: fructibus axillaribus, sessilibus.

Stem shrubby, covered with a roughish and ash-coloured bark, from three to five feet high: branches alternate, variously subdivided, tomentose when young, collected into a dense head. Leaves without order, very close together (the terminal ones opposite), from four to six lines in length, and scarcely two in width: margins rather revolute and waved, the longitudinal rib branched, and running out into a very short petiole, furnished with two awl-shaped deciduous stipules. They are all very tomentose and of a reddish-gray colour underneath, wrinkled above, and terminated by a soft mucro. Acorns regularly in pairs in the axils of the leaves towards the extremity of the branches; oval, smooth, of the size of a pea, and half covered by the cup, which is hemisphærical, pubescent, and rough with scales.

This species is found on the high mountains of Acambaro in South America, near the road that leads from Huanajuato to San Miguel el Grande, where I found it flowering in the months of September and November 1791. It is by no means a common tree.

Obs. On the lower surface of its leaves grow reddish globular galls, scarcely equal in diameter to the third part of a hemp-seed.

2. QUERCUS SALICIFOLIA.

Quercus foliis oblongo-lanceolatis, integerrimis, nitidis; nervulorum axillis postice tomentosis: fructibus axillaribus, subsessilibus.

Linnæus has given so short a description of his *Quercus phellos*, that it is very difficult to determine the plant he meant; and indeed Lamarck, in his dictionary, unites five trees under the name of Q. phellos, because they all have oblong leaves, resembling in some respect those of the common sage. To one of them he has referred the figure and definition given by Plukenet in his Almatheum, plate 441. fig. 7. which represents the fruit as solitary, and with peduncles nearly equal to them in length. There is indeed some resemblance between Q. salicifolia and Plukenet's species, but not sufficient to consider them as the same.

This species rises to the height of eighteen feet. Its branches are alternate, rather furrowed, pubescent when young, and covered with a reddish-brown bark. Leaves, at the distance of an inch or less from each other, five or seven inches long, and one inch wide, with entire margins but rather waved, sharply pointed, somewhat coriaceous, smooth, green, and delicately veined above, yellowish below, with a longitudinal branched midrib, prolonged into a reddish petiole of the length of a line: within the angles formed by the branches as they issue from the midrib are round red coloured brushes of wool, equal in size to the head of a pin: an excellent character, and almost peculiar to this species.

Fruit axillary, nearly sessile, and generally in pairs: acorns of the size of small hazel-nuts, half buried in the cup, delicately pubescent, and terminated by the pointed remains of the style: cups hemisphærical, ash-coloured, pubescent, and their scales too delicate to produce any roughness.

Grows about Acapulco, where I observed it in company with *Fagara octandra*, *Hymenæa Curbaril*, called by the natives Guapinoli, *Guilandina Bonduc*, *Crescentia Cujete*, known in that neighbourhood by the name of Tecomate, *Bombax pentandra*, called Pocholt, and *Rhizophora Mangle*, which last is used by the fishermen for giving a brown colour to their nets.

3. QUERCUS ACUTIFOLIA.

Quercus foliis ovato-lanceolatis, acumine producto, basi inæquali, sinuato-dentatis, dentibus setaceo-mucronatis, nervulorum axillis tomentosis: fructibus subracemosis, breviter pedunculatis.

Though this tree comes near to one of the varieties of *Quercus rubra* L., described by Lamarck in his Dictionary, yet I think it sufficiently distinct as a species. It is the loftiest of all the oaks of New Spain: its trunk attains the height of five-and-twenty feet, and is terminated by a close head of numerous alternate branches, variously subdivided. Leaves supported by a footstalk more than an inch in length, alternate, from five to six inches long, one and a half to two inches wide, ovate at the base, but one side rather longer than the other, acuminate to the tip, which is lengthened out into an acute point: margin more or less deeply sinuate, with awl-shaped bristly teeth: the upper surface green, veined, and glossy, the lower reddish, with a longitudinal rib; the angles of the alternate transverse ribs furnished with small brushes of wool, as in the foregoing species. The female flowers in the axils of the leaves, in very short racemes, each with four flowers on minute peduncles: germen ovate, with three styles.

Fruit scarcely of the size of a pea: the acorn nearly covered by the cup, which is beset with small and dark-coloured scales, and has its margin inflected.

This species grows abundantly on the road from Acapulco to Mexico, especially beyond the river Mescala, where I likewise met with *Yucca filamentosa*, called la Palma del Monte, *Agave americana*, *Achras mammosa*, *Achras zapotillo*, known there by the name of Chico Zapote, and the *Carica Papaya*.

4. QUERCUS MAGNOLIÆFOLIA.

Quercus foliis ovato-oblongis, supra nitidis, subtus tomentosis: fructibus axillaribus, racemosis.

A handsome tree, exceeding the height of twenty feet, including the head. Trunk covered with a dark-coloured rugged bark. Principal branches horizontal, the smaller ones furrowed, and besprinkled with oblong dots of a whitish colour. Leaves rather close together, ovate, sometimes notched at the base, from six to eight inches long, three inches wide, rigid, entire, of a green colour, smooth and glossy above, tomentose and alternately ribbed underneath, with a net-work of veins in the interstices; petiole thick, a line long, with a bristly tomentose stipule on each side.—The racemes of the female flowers axillary, solitary, two inches long; flowers sessile, alternate at the lower part, opposite towards the top.

Acorns ovate, the size of a pea, half sunk in hæmisphærical cups, and covered with rather prominent scales.

It is found between the villages Chilpancingo and Tixtala, in New Spain, as also in the neighbourhood of the river Azul. I discovered trees of Quercus magnoliæfolia in April 1791, and upon them several parasitical plants, such as *Epidendra* and *Tillandsia ligulata,* commonly called there Flor del Incienso. Mixed with this species of oak I also found *Psydium pomiferum* and *pyriferum,* the habitation of a great number of caterpillars, that construct ovate coccoons eight inches long, consisting of a gray silk, which being prepared by the inhabitants of Chilpancingo, Tixtala, and other places, is manufactured into stockings and handkerchiefs.

5. QUERCUS LUTEA.

Quercus foliis subovatis, subcordatis, inferne angustioribus, subtus luteis: fructibus racemosis.

In its manner of growth, and in the parts of fructification, this species approaches very near to the preceding one, and might perhaps be considered as a variety only, though there appears to be sufficient difference in the leaves, which have their lower surface of an ochre-yellow colour; they are also rather larger, narrower, and more notched at the petiole, and wider towards the top.

It is found with the preceding species.

6. QUERCUS PEDUNCULARIS.

Quercus foliis oblongo-ovatis, dense tomentosis, crenato-dentatis: florum racemis elongatis, versus apicem floriferis.

It attains the height of twenty feet. Trunk straight, covered with an ash-coloured rugged bark, much branched: branches alternate, with many subramifications, and clothed with a close red wool. Leaves standing pretty closely, about five inches long, and nearly two inches broad; their base obtuse, tip pointed, and margins more or less sinuated and toothed: upper surface green, and very smooth, lower tomentose, and of a yellow brown colour, with a longitudinal rib, lengthened out into a small tomentose petiole.—The female flowers are situated towards the extremity of the common peduncle, which is axillary, solitary, and three or four inches in length.

Fruit rather larger than a pepper-corn: acorns almost covered by the scaly, tomentose, and pale-red cups.

This tree is met with between Acapulco and Mexico, beyond the river Mescala, where I discovered it in April 1791.

7. QUERCUS DIVERSIFOLIA.

Quercus foliis ovatis, subtus tomentosis, integris aut dentatis: fructibus racemosis.

A small tree from ten to fourteen feet high, seldom of straight growth: trunk covered with a dark-coloured wrinkled bark, much branched: branches alternate, variously subdivided, thickly beset with leaves, some of which are an inch and a half or more in length, and entire, others still larger, and toothed towards the point, both agreeing in being ovate, light green, and smooth on the upper, woolly and yellowish on the lower surface: petioles not much exceeding a line, with two oblong, scariose, tapering, red-coloured, deciduous stipules.

Fruit sessile, growing four or five together near the extremity of a common filiform axillary peduncle about two inches in length: cups globose, like large peas, covered with small scales, containing acorns, which project but very little beyond them.

This species is not common. I found it near the villages of Chalma and Santa Rosa (in New Spain), together with *Pinus Strobus, Carolinea princeps, Betula nigra, Mimosa circinalis, cinerea,* and *cornigera.*

8. QUERCUS AGRIFOLIA.

Quercus foliis lato-ovatis, subcordatis, dentato-spinosis, glabris: fructibus axillaribus, sessilibus.

An Ilex folio agrifolii americana, forte agria, vel aquifolia glandifera. *Plukenet tab.* 196. *fig.* 3.?

I cannot give the height of this tree, of which I have only seen branches collected at Monterey and Nootka, by the marine officer, Don Joseph Robredo, and Don Manuel Esquerra, paymaster of the corvette Atrevida. The bark of the branches is ash-coloured and smooth. Leaves two inches long, and nearly as wide, are very smooth, veined, rather heart-shaped, with a small number of distant and prickly teeth.—Male flowers sessile, on slender racemes two inches long: calyx shorter than the five filaments: anthers large, bilocular.—Female flowers sessile, in the axils of the leaves, generally in pairs: cups hemisphærical and furnished with loose yellow scales: the acorns three times larger than the cups (about eight lines long), ovate, pointed at the top.

9. QUERCUS CIRCINATA.

Quercus foliis ovatis, utrinque acutis, crenatis: fructibus axillaribus, subsessilibus.

Grows to the height of from 20 to 25 feet. Trunk straight: bark ash-coloured, and rugged: principal branches horizontal, the rest more or less erect, longitudinally furrowed and villous. Leaves alternate, from five to six inches long and three inches broad, crenated and undulated, tapering towards both extremities; their upper surface green and smooth, lower more or less tomentose, and of varying colour, being either deep yellow or brown: petioles very short, and lengthened out into the midrib: transversal ribs alternate, with numerous anastomozing veins between.

Fruit on a very short axillary peduncle: cups the size of a pea, with pointed scales: acorns hid within the cup so as to show the point only.

Grows between Tixtala and Chilpancingo, where I saw it in April 1791, in company with *Cupressus disticha, Plumeria alba* and *rubra*, and *Poinciana elata*, the flowers of which plants are made into nosegays by the Indians, and presented to their Alcaldes at church.

Obs. 1. With regard to the shape of its leaves, this species of oak approaches the figure given by Plukenet Pl. 54. fig. 3. as *Quercus virginiana castaneæ folio*, which Linnæus and Lamarck quote as a synonym of *Quercus Prinos*; and the last-mentioned author adds that the acorns are said to be very large. But in our *Quercus circinata* the fruit is very small, and the leaves proportionably much broader, obtusely sinuated, and their margins never turned down; whence I consider it as distinct from Quercus Prinos.

Obs. 2. On the road leading from the river Azul towards Tixtala, and on that from Chilpancingo to Santa Rosa, at three leagues from Huanaxuato, I met with another oak without either flowers or fruit, which I consider as a variety of the one just described. It is about 20 feet high, and pretty much branched: the principal branches horizontal, the others erect, and the youngest of them pubescent. The leaves are pretty much the same with those of Q. circinata, but their indentures are more or less toothed, and the tomentum of the lower surface is of a grayish brown colour. Future observers of its fructification will decide whether it belong to that species or not.

10. QUERCUS MACROPHYLLA.

Quercus foliis cuneato-ovatis, amplis, crenatis, basi emarginatis: fructu pedunculato.

The height of this oak is thirty feet: trunk stout and straight; head compact; the principal branches horizontal, the others erect, and furrowed when in a young state. Leaves attain the length of one foot, and the width of seven or eight inches towards the upper end, which is rounded; tapering towards the base, which is not more than four lines broad, and notched: margins crenate and undulate; upper surface green and glossy, lower yellowish and covered with a delicate tomentum: petioles thick and very short, and running out into a prominent midrib, from which issue alternate horizontal ribs, with a profusion of anastomozing veins between.—The female flowers, which I have observed in a very young state, are sessile, on a terminal common peduncle, surrounded with awl-shaped pubescent bractes.

I fell in with this species on the road from Tixtala to Chilpancingo, and at the cave in Mount Omiapa.

OBS. I found another oak among the pines of Huisquiluca, on the road from Mexico to Chalma, and on the mountains of Ocuila, which differed from the one just described in respect to the dimensions only, its trunk to the beginning of the branches being from 10 to 15 feet, and its leaves half a foot long. In all of them I observed the extremities of the branches so closely covered with leaves, that the whole gave the idea of one huge palmated leaf composed of four or five smaller ones.

11. QUERCUS RUGOSA.

Quercus foliis ovato-oblongis, cordatis, rugosis, crassis, limbo versus apicem dentato.

A middle-sized tree, with a number of alternate round branches, covered with an ash-coloured bark, roughened with small tubercles. Leaves three inches long and almost two wide; they are thick, coriaceous, rugose, and toothed from the middle of the margins to the point; upper surface green and smooth, lower delicately pubescent and of a brownish-red colour; base notched: petiole thick, scarcely two lines long.—The female flowers on axillary, scaly racemes, I saw only in an undeveloped state.

This oak is found growing in the woods of Huisquiluca and Ocuila, and among the pines on the road from Mexico to Santo Christo de Chalma.

12. QUERCUS SPLENDENS.

Quercus foliis oblongo-ovatis, dentatis, subtus tomentosis.

Unfortunately I had no opportunity of seeing either flowers or fruit of this species. Its trunk is straight, about 15 feet in length, much branched: branches horizontal, subdivided into other erect ones, that are covered with a most brilliant red wool. Leaves without order, rather close together, about three inches long and one inch and a half broad, rather sinuated, and unequally toothed; upper surface green and somewhat pubescent, lower clothed with a thick brilliant red tomentum, concealing every part except the midrib: petioles very short, each with two awl-shaped tomentose stipules.

It is not uncommon in the neighbourhood of Tixtala, where I discovered it in April 1791.

OBS. This species is very different from *Quercus velutina* of Lamarck, its leaves being neither wedge-shaped towards the base, nor having teeth furnished with bristles.

13. QUERCUS CASTANEA.

Quercus foliis sublanceolatis, subcordatis, serratis, serraturis aristatis, supra nitidis, subtus tomentosis.

A small tree of about 12 feet in height, pre ty straight, covered with a dark-coloured rugged bark. Principal branches alternate, straight, smooth; the young ones furrowed. Leaves three inches long, one broad, acuminate, serrated, each tooth terminating in a bristle-shaped point, rather shorter than that at the extremity; base obtusely notched; upper surface green and very smooth, lower more or less yellow and pubescent: petioles of one or two lines in length, without stipules.—The flowers and fruit I had no opportunity of examining.

Grows along the road leading from Ixmiquilpan to Cimapan and Acambaro, where I saw it in April 1791*.

Obs. On this tree is found a species of misseltoe approaching *Viscum album* L., but more abundantly *Tillandsia usnoides*, of a cinereous colour, hanging down the length of a fathom.

14. QUERCUS CANDICANS.

Quercus foliis ovatis, sinuato-pinnatifidis, lobis dentatis; supra glabris, subtus tomentosis albis.

A middle-sized tree, with straight trunk, and branches forming a compact head. Leaves six inches long, and four broad, ovate, veined, tapering towards both extremities, green and smooth above, white and tomentose underneath, each margin with five or six indentures, half an inch deep: lobes toothed, each tooth terminated by a very short point: petiole four lines long.

I met with this species in the sandy neighbourhood of Tixtala, in the month of April 1791.

Obs. Fig. 4. of pl. 54. of Plukenet's work may convey an idea of the leaves of this tree, but the angles are less deep than as there represented.

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* On the same road I met with a vast number of Cacti of various shape and size, one of them five feet in diameter, three feet in height, and fluted round with 57 furrows.

15. QUERCUS LOBATA.

Quercus foliis lobatis, superne orbiculatis, basi cuneatis, lobis dentatis.

Of this species I have only seen branches brought from Monterey by S^{res} Robredo and Esquerra; they are alternate, sulcated and smooth. Leaves alternate, rounded at the top, cuneate toward the base, four inches long, and two and a half wide in the middle and towards the tip: margins deeply sinuate, lobes obtuse, toothed: petiole thin, 3—4 lines long.

16. QUERCUS ELLIPTICA.

Quercus foliis integerrimis, ellipticis, coriaceis, subsessilibus.

A strong tree, about twelve feet high, covered with an ash-coloured bark. Principal branches horizontal; the others more or less erect, thickly beset with leaves, three inches long and one and a half wide, coriaceous, entire, with margins somewhat revolute, rounded at both extremities; upper surface smooth, lower roughish, with a projecting midrib, and alternate lateral nerves, forked towards the margins: petiole thick and very short.

Is to be met with on the roads leading from Ixmiquilpan to Cimapan, and from Tixtala to the river Azul.

IX. *A Monograph of the Genus Carex, by* GEORGE WAHLENBERG, *of Upsal*[†].

SPECIES CARICUM.

UNISPICATÆ, i. e. spica unica simplicissima androgyna (exc. 1.) apice mascula instructæ.

1. DISTIGMATICÆ.

1. C. *dioica* *[‡] : spica feminea oblonga densiflora, floribus distigmaticis, capsulis ovali-ovatis utrinque convexis nervosis subcoriaceis superne serrulate marginatis, foliis filiformibus, radice stolonifera.—*C. dioica* Linn. Schkuhr Car. n. 1. tab. A. Q. W. fig. 1. 2.—*C. lævis* Hoppe.

β. C. *Davalliana* : spica sublineari subdensiflora, capsulis attenuatis recurvis; culmo acutangulo serrulato, foliis brevissimis, radice cæspitosa.—*C. Davalliana* Smith Linn. Transact. vol. v. p. 226. Schkuhr Car. tab. A. fig. 2.—*C. scabra* Hoppe.

Habitat in Helvetia vulgaris, et in Germania.

2. C. *capitata* * : spica subglobosa, floribus distigmaticis, capsulis circinato-ovatis convexiusculo-planis lævissimis tenuibus obtuse marginatis, foliis filiformibus.—*C. capitata* Linn. Schkuhr Car. n. 2. tab. Y. fig. 80.

Hab. in subalpinis Lapponiæ.

3. C. *leptalea* : spica pauciflora subsparsiflora, floribus distigmaticis, capsulis oblongo-ellipticis emarginatis, foliis angustissimis.—*C. polytrichoides* Willden. in litteris ad Cel. Swartz.

Hab. in America boreali, sec. herbarium *Cl. Torneri.*

4. C. *psyllophora* * : spica pauciflora subsparsiflora, floribus

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[†] Kongl. Vetenskaps Academiens nya Handlingar för Aprilis, Majus, Junius, 1803. p. 138.

[‡] The species marked with an asterisk are indigenous to Sweden.

distigmaticis,

Digitized

distigmaticis, capsulis oblongis acuminatis utrinque convexiusculis reflexis, foliis setaceis, vaginis intimis aphyllis.—*C. psyllophora* Ehrhart.—*C. pulicaris* Schkuhr Car. n. 3. tab. A. fig. 3.

Hab. in Sueciæ temperatioris &c. pratis subhumidis.

2. TRISTIGMATICÆ.

5. C. *obtusata**: spica subquadriflora, floribus tristigmaticis, capsulis obovato-subglobosis subcoriaceis patenti-divergentibus ore hyalino bilobo, foliis angustissimis.—*C. obtusata* Liljeblad Act. Stockholm. 1793. p. 69. tab. IV.

Hab. in Oelandiæ siccis arenosis ad Koping, *Liljeblad* et *Swartz*.

6. C. *petræa**; spica floribus femineis tribus sparsis tristigmaticis masculisque numerosis instructa, squamis subcircinatis magnis fragilissimis, capsulis turbinatis tenuissimis erectis, culmo acutangulo.

Hab. in rupibus alpium Lapponiæ septentrionalis.

7. C. *pyrenaica*: spica multiflora valde densiflora, floribus femineis numerosis tristigmaticis, capsulis anguste oblongis breviter rostratis divergentibus.

Hab. in Pyrenæis, *La Peyrouse*: ex herb. *Thunbergiano*.

8. C. *leucoglochin**: spica triflora subsparsiflora, floribus femineis tristigmaticis masculoque unico, capsulis lanceolatis teretibus reflexis, folio intimo subconvoluto vaginis cæteris aphyllis.—*C. leucoglochin* Ehrhart.—*C. pulicaris* Linn. Flor. Suec.—*C. pauciflora* Schkuhr Car. n. 4. tab. A. fig. 4.

Hab. in Sueciæ septentr. &c. paludibus vulgaris.

9. C. *microglochin**: spica submultiflora densiflora, floribus tristigmaticis, capsulis lanceolato-conicis convexo-planiusculis reflexis, arista styliformi longiuscula, foliis filiformibus.

Hab. in lateribus irriguis alpium Lapponicarum septentrionalium.

10. C. *hamata:* spica sublongissima, floribus tristigmaticis, squamis ovalibus æquantibus obvolventibus, capsulis oblongis obtusis convexo-subconcaviusculis ciliatis, arista longa uncinata.—*C. hamata* Swartz Prodr.—*C. uncinata* Schkuhr Car. n. 7. tab. G. fig. 30.—*C. phleoides* Cavanilles Icon. vol. v. p. 40. tab. 464. fig. 1.

    Hab. in montibus Jamaicæ, *Swartz*; in Chili Americes meridionalis, secundum *Cavanilles*; et in Isle de France, *Grondal.*

11. C. *uncinata:* spica longissima superne incrassata, floribus tristigmaticis, squamis adnatis oblongis subbrevibus, capsulis oblongis breviter rostratis teretiusculis, arista sublonga uncinata.—*C. uncinata* Linn. Suppl.

    Hab. in Nova Zeelandia, *Forster.* Ex herbario *Thunbergiano.*

12. C. *erinacea:* spica lineari subbrevi, floribus tristigmaticis, squamis subcircinatis majusculis, capsulis subrotundo-ovatis triquetris, arista longissima uncinata.—*C. erinacea* Cavanilles Icon. vol. v. p. 40. tab. 464. fig. 2.

    Hab. in Americæ meridionalis oris occidentalibus.

SPICULATÆ: culmo diviso in spiculas androgynas (except. n. 40.) semper exacte sessiles, suffultas bracteolis semper subamplectentibus, et floribus distigmaticis (except. n. 13—16.) instructas.

1. *Spiculis apice masculis.*

13. C. *baldensis:* spiculis apice masculis ternis consitis, floribus tristigmaticis, capsulis oblongo-ellipticis obtusis cum apiculo, bracteolis duabus foliolatis.—*C. baldensis* Linn. Schkuhr Car. tab. Y. fig. 81.

14. C. *capensis:* spiculis apice masculis subcompositis approximatis,

proximatis, floribus tristigmaticis, capsulis oblongis acutis utrinque convexiusculis obtusangulis subexcurvis, bracteolis subfoliatis, culmo tereti.—*C. capensis* Thunberg Flora cap. c. icon. ined.

15. C. *Bellardi:* subspiculata, spiculis bifloris in spicam linearem confertis, flore inferiore femineo tristigmatico superiore masculo, squamis subcircinatis magnis fragilissimis, capsulis turbinatis tenuissimis, culmo tereti, foliis filiformibus.—*C. Bellardi* Allion. Schkuhr Car. n. 6. tab. D. fig. 16.

16. C. *curvula:* spiculis apice masculis in clavulam oblongam aggregatis, floribus tristigmaticis, capsulis teretiusculo-depressis attenuatis, culmo tereti subincurvo, foliis convolutis heteromallis.—*C. curvula* Allion. Schkuhr Car. n. 25. tab. D. et H h. fig. 17.

17. C. *juncifolia:* spiculis apice masculis in clavulam oblongam aggregatis, capsulis teretiusculo-depressis attenuatis ore bilobo, culmo tereti incurvo, foliis convolutis intimis brevissimis.—*C. juncifolia* Allion.

Hab. in alpibus Carinthiacis, unde missa ad Cl. *Swartz.*

18. C. *simpliciuscula:* spiculis apice masculis in clavulam linearem confertis, capsulis oblongis depressis breviter rostratis ore integerrimo, foliis angustissimis convolutis. Hab. in Westmorlandia Angliæ, unde misit Cl. *Turner* ad *Swartz.*

19. C. *incurva* *: spiculis apice masculis in globum ovato-globosum dense aggregatis paucis subdivergentibus, capsulis circinato-ovatis semiglobosis rostellatis ore subintegerrimo, culmo subacutangulo subincurvo, foliis subconvolutis.—*C. incurva* Lightfoot. Schkuhr Car. n. 19. tab. H h. fig. 25.

Hab. in litoribus maris occidentalis Scandinaviæ.

20. C. *fœtida:* spiculis apice masculis in globum elliptico-ovalem dense aggregatis numerosis, capsulis ovalibus convexiusculo-planis attenuatis ore bifido, culmo acutangulo,

gulo, foliis subangustis.—*C. fœtida* Allion. Schkuhr Car. n. 16. tab. H h. fig. 96. Scheuchzer Prodr. tab. iv. fig. 3.

Hab. in alpibus Helveticis.

21. C. *stenophylla:* spiculis apice masculis in globum ovatum aggregatis, capsulis ventricoso-subrotundis convexo-planiusculis nervosis marginibus serrulatis ore bidentato, culmo acutangulo, foliis angustissimis.—*C. juncifolia* Host. Schkuhr Car. n. 18. tab. G. et J i. fig. 32.

22. C. *chordorrhiza* *: spiculis apice masculis subaggregatis, capsulis semiglobosis ligneis basi elongata, folio intimo perbrevi vaginis cæteris aphyllis, radice filiformi procumbente.—*C. chordorrhiza* Ehrhart. Schkuhr Car. n. 17. tab. G. fig. 31.

Hab. in Sueciæ septentrionalioris paludibus, sat vulgaris.

23. C. *lobata:* spiculis apice masculis subternis confertis elliptico-ovalibus, capsulis oblongis convexo-convexiusculis subacutangulis breviter rostratis ore unilabiato, culmo flaccido.—*C. lobata* Schkuhr Car. n. 20. tab. J i. fig. 18.—*C. tripartita* All.

Hab. in alpibus Helveticis, Pedemontanis, &c.

24. C. *paradoxa:* spiculis masculis in paniculam digestis, ramis inferioribus subdistantibus, capsulis subrotundo-ovalibus convexo-convexiusculis subobtusangulis ore bidentato.—*C. paradoxa* Willden. Act. Berol. Schkuhr Car. n. 23. tab. E. fig. 21.

Hab. in aquosis juxta Berolinum et Halam.

25. C. *paniculata:* spiculis apice masculis in paniculam digestis, capsulis subrotundo-conicis acuminatis utrinque gibbis superne membranaceo-marginatis ore diviso.—*C. paniculata* Linn. Schkuhr Car. n. 24. tab. C. fig. 20.

Hab. in paludosis Sueciæ &c.

β. C. *teretiuscula:* thyrso decomposito squarroso.—*C. teretiuscula* Gooden. Linn. Transact.—*C. diandra* Schrank. *C. cinerea mihi* olim.

Hab. in paludosis Angliæ (unde misit Cl. *Turner* ad *Swartz*) Germaniæ et Sueciæ.

26. C. *rivularis:* spiculis apice masculis quinis subapproximatis oblongis, squamis æquantibus *mucronatis,* capsulis subrotundo-ventricosis subrostellatis convexo-subconcaviusculis superne membranaceo-marginatis ore diviso.—*C. rivularis* Willden. Schkuhr Car. n. 21. tab. C c. fig. 87.

Hab. juxta rivulos Hungariæ.

27. C. *divisa:* spiculis apice masculis in clavam sublateralem subdecompositam ovatam aggregatis, bracteola subfoliolata stricta, capsulis subrotundo-ovatis convexo-subconcaviusculis acutangulis ore bifurcato.—*C. divisa* Gooden. Linn. Transact. vol. 2. p. 157. tab. 9. fig. 2. Schkuhr Car. n. 11. tab. V v. fig. 61.

Hab. in litoribus Angliæ.

28. C. *muricata* *: spiculis apice masculis in clavam crassiusculam subdecompositam approximatis, capsulis convexo-planis subovali-conicis acuminatis acutangulis divergentibus marginibus superne serrulatis, foliis subangustis.—*C. muricata* Gooden. Schkuhr Car. n. 13. tab. E. fig. 22.

β. C. *divulsa:* clava inferne subramosa ramulis distantibus, capsulis ovato-circinatis convexiusculo-planis patentibus, marginibus superne extenuatis integerrimis, culmo laxo, foliis angustis.—*C. divulsa* Gooden. Schkuhr Car. n. 12. tab. W w. fig. 89.

Hab. in Angliæ nemorosis subhumidis.

γ. capsulis subacutangulis.—*C. loliacea* Schkuhr Car. n. 14. tab. E e. fig. 91. Suter Flor. Helv. n. 18.

29. C. *vulpina* *: spiculis apice masculis in clavam supradecompositam cylindraceam crassissimam conglomeratis, capsulis majusculis subovali-conicis acuminatis convexo-planis acutangulis divergentibus, culmo acutissangulo,

foliis latis.—*C. vulpina* Linn. Schkuhr Car. n. 10. tab. C. fig. 10.

β. C. *glomerata:* clava oblonga, culmo obtusangulo, foliis latiusculis subbrevibus.—*C. glomerata* Thunberg Flor. Cap. Prodr.

30. C. *microsperma:* spiculis apice masculis in clavam supradecompositam crassiusculam conglomeratis, squamis cuspidatis, capsulis minutis ventricoso-ovalibus acuminato-subrostratis acutangulis subdivergentibus, foliis subangustis.

Hab. in Pensylvania, Rev. *Hultgren;* secundum herbar. Thunbergianum.

31. C. *intermedia*:* spiculis inferioribus terminalique femineis intermediis masculis, capsulis acute marginatis.—*C. intermedia* Gooden. Schkuhr Car. n. 9. tab. B. fig. 7.

32. C. *arenaria*:* spiculis inferioribus femineis supremis masculis, capsulis membranaceo-marginatis, bracteolis inferioribus subfoliolatis, radice repente.—*C. arenaria* Linn. Schkuhr Car. n. 8. tab. B. fig. 6.

β. C. *repens:* spiculis tantum subapproximatis, bracteolis squamaceis muticis, culmo teretiusculo.—*C. repens* Bellardi App. Flor. Pedemont. In herbario *Thunbergiano* adest a *Bellardi* missa.

2. *Spiculis basi masculis.*

33. C. *cyperoides:* spiculis basi masculis in capitulum congestis, squamis lineari-setaceis, capsulis bicuspidatis, bracteolis consitis foliatis longis.—*C. cyperoides* Schkuhr Car. n. 28. tab. A. fig. 5.

34. C. *tribuloides:* spiculis basi masculis confertis numerosis, squamis subparvis, capsulis ovali-oblongis subconvexiusculo-planis acuminatis patentibus membranaceo-marginatis, ore bidentato.

Hab. in America boreali, *Kalm;* ex herbar. Cel. *Swartzii.*

35. C. *lepo-*

35. C. *leporina** : spiculis basi masculis approximatis quinis, squamis æquantibus, capsulis ovato-ovalibus conico-acuminatis convexiusculo-subconcaviusculis membranaceo-marginatis ore bifido.—*C. leporina* Linn.—C. *ovalis* Gooden. Schkuhr Car. n. 29. tab. B. fig. 8.

36. C. *Schreberi :* spiculis basi masculis subconfertis quinis, squamis æquantibus, capsulis ovali-ovatis acutiusculis convexo-planis subacutangulis marginibus obtusiusculis ore emarginato, foliis angustissimis, radice repente.—*C. Schreberi* Willden. Schkuhr Car. n. 30. tab. B. fig. 9.

Hab. in arenosis juxta Berolinum &c.

37. C. *lagopina* :* spiculis basi masculis confertis ternis, squamis subparvis, capsulis subcircinatis acutis subrostellatis convexo-subconcaviusculis marginibus obtusis integerrimis ore bilabiato.—*C. leporina* Fl. Dan. t. 294.—*C. approximata* Hoppe herb.

Hab. in alpibus Lapponiarum septentr.

38. C. *straminea :* spiculis basi masculis subdistantibus quinis subglobosis, squamis lanceolatis longitudine æquantibus, capsulis subrotundo-obovatis rostellatis membranaceo-marginatis ore bifido.—*C. straminea* Willden. Schkuhr Car. n. 38. tab. G. fig. 34.

Hab. in America septentrionali.

39. C. *brizoides:* spiculis basi masculis numerosis contiguis sublanceolatis subexcurvis, capsulis ovato-lanceolatis convexissimo-subconcaviusculis attenuatis marginibus serrulatis ore bifido.—*C. brizoides* Linn. Schkuhr Car. n. 32. tab. C. fig. 12.

Hab. in nemorosis subhumidis Germaniæ, ex. gr. Erlangæ.

40. C. *mucronata :* spiculis lateralibus femineis duabus confertis terminali tota mascula, capsulis convexissimo-subconcaviusculis tenuissime ciliatis, bracteolis amplec-

tentibus subfoliatis; foliis filiformibus.—*C. mucronata* Allion. Schkuhr Car. n. 46. tab. K. fig. 44.

Hab. in alpibus Helveticis.

41. C. *elongata**: spiculis superioribus basi masculis in racemum subapproximatis subdensifloris, squamis subbrevibus, capsulis oblongis acuminatis convexo-convexis obtusangulis nervosis subexcurvis ore subintegerrimo.—*C. elongata* Linn. Schkuhr Car. n. 39. tab. E. fig. 25.

42. C. *microstachya**: spiculis lateralibus femineis paucis confertis minutis terminali basi mascula triplo longiore, squamis subbrevibus, capsulis ovatis acuminatis marginibus extenuatis submembranaceis.—*C. microstachya* Ehrhart. Schkuhr Car. n. 31. tab. C. fig. 11.

Hab. Upsaliæ locis humidis graminosis in prato Grönmalla et ad paludem Vitulfsbergensem.

43. C. *norvegica**: spiculis basi masculis subapproximatis quatuor ovali-ellipticis turgidis, squamis subcircinatis majusculis suborbiculatis apiculatis obtusangulis crassis, bracteolis cuspidatis.—*C. norvegica* Schkuhr Car. n. 40. tab. S. fig. 66.

Hab. in litoribus limosis maris Nordlandiæ Norvegicæ.

44. C. *glareosa**: spiculis ternis terminali basi mascula subconfertis oblongis, squamis æquantibus, capsulis oblongis acuminatis convexissimo-planis subacutangulis nervosis, foliis angustissimis intimo multum breviore, culmo flaccido.—*C. glareosa mihi* Schkuhr Car. tab. A a. fig. 97.

Hab. in littoribus marinis glareosis Norvegiæ septentrionalis, et ad Sinum Bottnicum.

45. C. *heleonastes**: spiculis basi masculis confertis quaternis subglobosis, squamis subæquantibus, capsulis ovatis acutis convexo-subconvexiusculis subobtusangulis patentibus, culmo stricto.—*C. heleonastes* Ehrhart. Schkuhr Car. n. 42. tab. J i. fig. 97.

Hab. in paludibus Sueciæ.

46. C. *stellulata:* spiculis basi masculis subapproximatis quaternis, capsulis ovali-conicis attenuatis convexo-planis acutangulis divaricatis.—*C. stellulata* Schreber. Schkuhr Car. n. 34. tab C. fig. 14.—*C. muricata* Linn. Fl. Suec.

β. C. *radiata:* spiculis subdistantibus trifloris, capsulis oblongis, bracteolis setigeris, culmo subsetaceo flaccido, foliis angustissimis.

Hab. in America boreali, Rev. *Hultgren*; secundum herbarium *Thunbergianum*.

47. C. *loliacea*:* spiculis basi masculis subdistantibus ternis paucifloris, squamis brevibus, capsulis subovali-ellipticis utrinque convexiusculis obtusis obtusangulis divaricatis ore integerrimo, bracteolis setigeris, foliis angustissimis.—*C. loliacea* Linn. confer Schkuhr tab. P p. 104?

Hab. in pratis paludosis Sueciæ rarius.

48. C. *tenuiflora*:* spiculis basi masculis confertis ternis submultifloris, squamis subæquantibus, capsulis late oblongo-ovatis acutiusculis convexo-planiusculis subacutangulis patentibus, foliis angustissimis.

Hab. in graminosis humidis Lapponiæ.

49. C. *canescens*:* spiculis basi masculis subapproximatis quinis, squamis subæquantibus, capsulis subrotundo-ovatis acutiusculis convexo-subconvexiusculis subobtusangulis ore bidentato.—*C. canescens* Linn. Flor. Suec.—*C. curta* Gooden. Schkuhr Car. n. 33. tab. C. fig. 13.

β. spiculis superioribus aggregatis, capsulis patentibus acutis convexo-planiusculis subacutangulis.

Hab. in summis alpibus Lapponiæ vulgatissime.

50. C. *remotiuscula:* spiculis basi masculis remotiusculis subsenis subpaucifloris, squamis subbrevibus, capsulis ovato-oblongis attenuatis convexo-planis acutangulis patentibus ore bifido, bracteolis inferioribus foliatis longis angustissimis.

Hab. in Sibiria, *Laxman*; e collectione Cel. *Swartzii*.

51. C. *remota**: spiculis basi masculis distantibus, squamis subbrevibus, capsulis oblongo-ovatis acuminatis convexo-planiusculis subacutangulis marginibus obtusis ore subbifido, bracteolis foliatis angustis, culmo laxo.—*C. remota* Linn. Schkuhr Car. n. 35. tab. E. fig. 23? Hab. locis nemorosis siccis in Hallands as, *Osbeck*.

52. C. *gibba:* spiculis basi masculis inferioribus subternatis subdistantibus, squamis brevibus, capsulis sublenticularibus rostellatis convexissimo-subconvexiusculis marginibus extenuatis integris ore bidentato, bracteolis foliatis longis subangustis, culmo laxo.—*C. remota* Thunberg Flor. Jap.

53. C. *axillaris:* spiculis basi masculis inferioribus subternatis subdistantibus, squamis subæquantibus, capsulis ovatis acuminato-subrostratis convexiusculo-planis marginibus acutissimis serrulatis ore profunde bifido, bracteolis inferioribus subfoliatis, culmo stricto.—*C. axillaris* Gooden.
Hab. in Anglia, unde misit Cel. *Afzelius*.

MULTISPICATÆ, culmo supportante *spicas* plures, raro compositas androgynas, in plerisque simplices sexu distinctas laterales femineas terminalem masculam (paucissimis nempe n. 114. 115. 130. et 131. pseud-androgynam); *floribus* tristigmaticis (in paucioribus distigmaticis) instructas; sustentatas *Pedunculis* semper conspicuis plerumque longis ad basin vaginulâ tenuissima semper obvolutis, in axillis bractearum foliatarum plerumque vaginantium (rarius subamplectentium) succositate insertis.

1. COMPOSITÆ i. e. spicis compositis ramosis ramisque semper androgynis apice masculis tristigmatis (except. n. 54.), bracteisque vaginantibus instructæ.

54. C. *brun-*

54. C. *brunnea*. spicis tripartito-compositis ramis linearibus, floribus distigmaticis, capsulis lentiformibus rostratis.—*C. brunnea* Thunberg Flor. Jap. Schkuhr tab. X x. fig. 111.

55. C. *spartea*: spicis compositis ramis aggregatis apice lineari, squamis ovalibus, capsulis triquetro-subglobosis obtusiusculis ore emarginato, foliis angustis marginibus subincurvis.—*C. indica* Schkuhr Car. n. 27. tab. *B b.* fig. 86.

Hab. in Capite bonæ spei, *Thunberg*.

56. C. *indica*: spicis compositis ramis aggregatis oblongis, squamis ovatis, capsulis ovalibus acuminato-subrostratis depresso-triquetris ore bifido.—*C. indica* Linn. mant. 575.

Hab. in insula Bourbon, *Sonnerat*; ex herbario Thunbergiano.

57. C. *polystachya*: spicis compositis pinnato-ramosis ramis confertis numerosissimis basi sparsifloris sursum attenuatis, squamis lanceolatis, capsulis lanceolatis subulato-rostratis recurvis, culmo stricto.—*C. polystachya* Swartz. Flor. Ind. Occid. Append.

Hab. in summis montibus Jamaicæ, *Swartz*.

58. C. *cladostachya*: spicis compositis ramis subapproximatis paucis vagis sparsifloris, squamis lanceolatis, capsulis oblongis subulato-rostratis excurvis, culmo flaccido, foliis subangustis.—*C. flaccida* Swartz Flor. ind. occid. Append.

Hab. in montibus Jamaicæ, *Swartz*.

59. C. *scabrella*: spicis compositis conglomerato-ramulosis ramulis subgloboso-ovatis, capsulis ovalibus acutis subexcurvis scabris, culmo debili, foliis angustissimis.—*C. laxa* Swartz. Flor. Ind. Occid. Append.

Hab. in montibus Jamaicæ, *Swartz*.

60. C. *cruciata*: spicis decompositis ramis ramulisque divaricatis, capsulis ovalibus rostro brevi subexcurvo.

Hab. ad Canton in China, *Wännman*; ex herbario Bergiano.

2. TRISTIGMATICÆ, spicis simplicibus sexu distinctis (rarissime pseudandrogynis);

A. Vaginatæ foliatæ i. e. bracteis vaginant. foliatis instructæ.

a. *Pedunculis inclusis.*

61. C. *flava:* spicis subpedunculatis ovalibus, bracteis vaginantibus longe foliatis subapproximatis, capsulis obovato-cuneiformibus inflatis costatis rostro longo aciculari deflexo, ore bifido.—*C. flava* Linn. Leers. Herb. n. 714. tab. 15. fig. 6.

β. C. *flavescens:* bracteis subdistantibus, capsulis oblongo-obovatis subinflatis rostro brevi subulato rectiusculo ore bidentato, culmo obtusangulo, foliis angustis intimis multum longioribus marginibus incurvis.—*C. Oederi* Ehrhart. Schkuhr Car. n. 35. tab. F. fig. 26.

62. C. *fulva**: spicis incluse pedunculatis ovali-oblongis, bracteis vaginantibus foliatis altitudine culmi distantibus, capsulis ovalibus convexo-convexis ancipitibus subinflatis subcostatis rostro longiusculo ancipiti ore diviso, culmo serrulato.—*C. fulva* Gooden. Schkuhr Car. n. 86. tab. T. fig. 67.

Hab. in pratis subhumidis Börstelæ, Roslagiæ, et Gothlandiæ.

63. C. *distans**: spicis incluse pedunculatis oblongis, bracteis longe vaginantibus foliatis remotissimis, squamis subbrevibus mucronatis, capsulis ovali-subventricosis depresso-triquetris rostellatis, ore bimucronato, foliis marginibus incurvis.—*C. distans* Linn. Schkuhr Car. n. 87. tab. T. et Y y. fig. 68.—*C. littoralis mihi* in Flor. Gothland. ined.

Hab. in litoribus Gothlandiæ, &c.

64. C. *cla-*

64. C. *clavata*: spicis incluse pedunculatis subcylindraceis subcrassissimis: mascula clavata, bracteis vaginantibus foliatis remotis, squamis subæquantibus mucronatis, capsulis subrotundo-ovalibus gibbis excurvis rostellatis, foliis latissimis.—*C. clavata* Thunberg in museo.

β. C. *cylindracea*: spicis cylindraceis subcrassis masculis pluribus, bracteis latissime longissimeque foliatis.

Hab. in Capite bonæ spei, *Thunberg*.

γ. C. *triticea*: spicis ovalibus crassissimis apice masculis, squamis æquantibus breviter cuspidatis.—*C. clavata* Thunberg. Prodr. Cap. p. 14. (sec. differentiam.)

E Capite bonæ spei in Belgarum hortos introducta ibique accepta a *Kallström* Hortul. prim.

65. C. *extensa**: spicis subsessilibus oblongis, bracteis subvaginantibus longe foliatis approximatis, capsulis ovali-oblongis cum acumine ore bidentato, culmo arcuato, foliis angustissimis subconvolutis heteromallis.—*C. extensa* Gooden. in Linn. Transact.—*C. arcuata mihi* in Flor. Gothland. cum fig. ined, Schkuhr Car. tab. Xx. fig. 72.

Hab. in Anglia unde missa a Cl. *Turnero* ad *Swartz*; et in litoribus Gothlandiæ.

66. C. *secalina*: spicis incluse pedunculatis late lanceolatis, bracteis breviter vaginantibus longissime foliatis infimis remotissimis, capsulis oblongis longe acuminato-rostratis convexo-concaviusculis adpressis marginibus serrato-ciliatis, ore bifido.—*C. secalina* Willden. Schkuhr Car. tab. S. fig. 65.

Hab. in Austria, secundum herbarium Cel. *Swartzii.*

67. C. *heterosperma*: spicis incluse pedunculatis subfiliformibus sparsifloris strictis, bracteis vaginantibus longe foliatis remotis, capsulis ovali-ventricosis basi elongata apice attenuata excurva, ore integerrimo.

Hab. in America boreali, *Kalm*; ex herbar. Cel. *Swartzii.*

68. C. *lep-*

68. C. *leptostachya:* spicis incluse pedunculatis filiformibus sparsifloris flaccidis, bracteis vaginantibus longe foliatis subremotis, capsulis oblongo-lanceolatis acutis ore unilabiato. — *C. leptostachya* Ehrhart. — *C. strigosa* Schkuhr Car. n. 30. tab. N. fig. 53.

Hab. in Anglia et Germania.

69. C. *subulata:* spicis angustis sublongis subdensifloris apice mascula, pedunculis inclusis bipartitis, bracteis vaginantibus longissime foliatis remotis, squamis cuspide capsulam multum superante, capsulis ovalibus triquetro-depressis rostro bicuspidato, foliis latis.

Hab. in insula Bourbon, *Sonnerat*; ex herbario *Thunbergiano.*

70. C. *hirta:* spicis subincluse pedunculatis crassiusculis, bracteis vaginantibus longe foliatis remotis, squamis cuspide breviuscula æquante, capsulis anguste ovali-ovatis teretibus rostratis costatis hirsutis bicuspidatis, spicis masculis binatis.—*C. hirta* Linn. Schkuhr Car. n. 105. tab. U u. fig. 108.

71. C. *pumila:* spicis subexserte pedunculatis crassis, bracteis vaginantibus longe foliatis infima subradicali cæteris eæ approximatis, squamis subæquantibus, capsulis ovatis teretibus rostellatis ore bicorni, spicis masculis binatis.—*C. pumila* Thunberg Flor. Jap. Schkuhr tab. Y y. fig. 112.

72. C. *hordeiformis:* spicis incluse pedunculatis crassissimis, bracteis vaginantibus longissime foliatis infima subradicali cæteris eæ subapproximatis, capsulis ovatis acuminato - subrostratis convexissimo - concaviusculis marginibus serrato-ciliatis ore bifido, spicis masculis binatis.—*C. hordeistichos* Villars Delph. 2. p. 221. n. 43. tab. 6. In herbario *Swartzii* eam examinavi.

73. C. *Xanthophysa:* spicis subincluse pedunculatis sexfloris crassissimis, bracteis vaginantibus foliatis remotissimis,

tissimis, capsulis oblongo-conicis inflatis rostratis divergentibus ore bifido.

Hab. in America boreali, *Kjellman*; ex herbar. *Bergiano.*

74. C. *folliculata:* spicis subpedunculatis sexfloris crassissimis, bracteis vaginantibus longe foliatis subapproximatis, capsulis ovali-conicis acuminato-rostratis inflatis divergentibus maximis bicuspidatis, spica mascula gracillima, culmo acutangulo. — *C. folliculata* Linn. Schkuhr Car. n. 73. tab. N. fig. 52.

75. C. *lurida:* spicis incluse pedunculatis cylindraceis crassissimis cernuis, bracteis vaginantibus longissime foliatis distantibus, squamis setaceis, capsulis ovatis acuminatis subdivergentibus rostro longiusculo setaceo bicuspidato, spica mascula gracillima.

Hab. in America septentrionali, *Hultgren;* ex herbario *Swartzii.*

76. C. *Agastachys:* spicis incluse pedunculatis flagelliformibus flaccidis, bracteis vaginantibus foliatis remotiusculis, capsulis ovalibus acutiusculis ore bidentato, foliis latissimis.—*C. agastachys* Ehrhart.—*C. pendula* Schkuhr Car. n. 85. tab. Q. fig. 60.

77. C. *filiformis:* spicis subsessilibus oblongis, bracteis brevissime vaginantibus foliatis remotiusculis, capsulis ovali-ellipticis villosis rostello bifurcato, foliis convolutis.—*C. filiformis* Gooden. Schkuhr Car. n. 69. tab. K. fig. 45.

78. C. *rotundata*:* spicis subpedunculatis ovalibus, bracteis brevissime vaginantibus subfoliatis distantibus, squamis subæquantibus obtusis, capsulis subglobosis nitidis cum acumine subbilabiato, culmo tereti, foliis convolutis.—*C. globularis* Vahl. Schkuhr Car. n. 71. tab. G g. fig. 93.

Hab. in paludosis subalpinis Lapponiarum. Affinitate C. ampullaceæ proxima est.

b. *Pedunculis exsertis.*

79. C. *drymeja**: spicis longe exserte pedunculatis angustissimis subbrevibus sparsifloris nutantibus, bracteis vaginantibus foliatis remotis, squamis acuminatis æquantibus, capsulis subovali-ventricosis longiuscule rostratis ore diviso.—*C. drymeja* Ehrhart.—*C. sylvatica* Gooden. Schkuhr Car. n. 94. tab. L l. fig. 101.

Hab. in Quercetis per provincias Sueciæ meridionalis, ex. gr. Gothlandiam, Scaniam.

80. C. *lævigata*: spicis exserte pedunculatis cylindraceis, cernuis, bracteis vaginantibus foliatis subremotis, squamis subæquantibus mucronatis, capsulis oblongis acuminato-rostellatis patenti-divergentibus bicuspidatis.—*C. lævigata* Smith. Linn. Transact. vol. 5.—*C. patula* Link. Schkuhr Car. n. 97. tab. B b b. fig. 116. et n. 91. tab. z. fig. 83. (excluso loco et synon.)

Hab. in Cornubia Angliæ, unde missa ad *Swartz* a Cl. *Turnero*; nec non in Lusitania, *Link.*

81. C. *Forsteri*: spicis longe exserte pedunculatis cylindraceis pendulis basi mascula, bracteis longiuscule vaginantibus longissime foliatis remotis, capsulis oblongo-ovatis attenuatis rostro subulato recurvo, spicis masculis binis.—*C. debilis* Forster.—*C. recurva* Schkuhr Car. n. 100. tab. N n. fig. 84.

Hab. in Nova Zeelandia.

82. C. *brachystachya*: spicis longe exserte pedunculatis angustissimis brevibus sparsifloris, bracteis vaginantibus subfoliatis subremotis, squamis brevibus submucronatis, capsulis lanceolatis ore bidentato, culmo setaceo foliis angustissimis convolutis.—*C. brachystachya* Schrank. Schkuhr Car. n. 83. tab. P. fig. 58. In herbario *Burseriano* adest ex alpibus Helveticis.

83. C. *frigida*: spicis exserte pedunculatis oblongis cernuis terminali pseudandrogyna, bracteis vaginantibus

foliatis remotis, squamis subbrevibus, capsulis lanceolatis ore bilobo.—*C. frigida* Allion.—*C. fuliginosa* Schkuhr Car. n. 76. tab. C c. fig. 47. c. Ex alpibus Carinthiacis accepit Cel. *Swartz.*

84. C. *ferruginea:* spicis longe exserte pedunculatis sparsifloris nutantibus, bracteis vaginantibus subfoliatis subremotis, squamis subæquantibus, capsulis oblongis acuminatis rostellatis ore subintegro, foliis angustis.—*C. ferruginea* Scop.—*C. alpina* Schrank. In herbario *Swartzii* eam scrutavi.

85. C. *grisea:* spicis exserte pedunculatis sexfloris sparsifloris, bracteis vaginantibus longissime foliatis remotissimis, squamis cuspidatis, capsulis oblongo-ovalibus triquetris acutiusculis ore integerrimo. Patria ignota est; an America borealis? In herbario *Swartzii* asservatur.

86. C. *depauperata:* spicis exserte pedunculatis bifloris, bracteis vaginantibus foliatis remotis, capsulis subgloboso-ventricosis longiuscule rostratis magnis, ore bilobo.—*C. depauperata* Goodenough.—*C. ventricosa* Curtis Flor. Lond. n. 64. optima.

87. C. *valesiaca:* spicis basi biflora apice mascula, pedunculis longe exsertis flaccidis, bracteis vaginantibus longe foliatis remotis infima radicali, capsulis late obovatis rotundatis apiculatis, spica mascula flaccida, foliis subangustissimis.—*C. valesiaca* Suter Fl. Helv. 2. n. 57. Schkuhr Car. tab. B b b. fig. 117.

B. Vaginatæ foliatæ, i. e. bracteis vaginantibus foliatis dotatæ.

88. C. *chinensis:* spicis subincluse pedunculatis cylindraceis, bracteis inflate vaginantibus angustissime subfoliolatis subremotis, squamis subsetaceis, capsulis ovali-ventricosis triquetris acuminato-rostratis hispidulis divergentibus.—*C. chinensis* Retzii Obs. 2. 42. 92.

Hab. ad Canton in China, *Bladh*; ex herbario *Thunbergiano.*

89. C. *Michelii:* spicis incluse pedunculatis crassiusculis brevibus, bracteis vaginantibus subfoliolatis subremotis, squamis acuminatis æquantibus, capsulis late obovatis longiuscule rostratis bicuspidatis.—*C. Michelii* Host. Schkuhr Car. n. 84. tab. P. et V v. fig. 59.—*C. ampullacea* Wulfen.

Hab. in Moravia &c.

90. C. *castanea:* spicis crassiusculis brevibus subdensifloris, pedunculis longe exsertis retrocurvis, bracteis laxe vaginantibus foliolatis distantibus, squamis brevibus, capsulis oblongis attenuatis patenti-divergentibus ore unilobo, foliis hirsutis.

Hab. in America boreali, secundum herb. Cl. *Torneri.*

91. C. *capillaris**: spicis angustissimis sparsifloris subpaucifloris, pedunculis longe exsertis recurvatis, bracteis vaginantibus foliolatis subdistantibus, squamis hyalinis deciduis, capsulis oblongis acuminatis ore subunilobo, spica mascula recurvata.—*C. capillaris* Linn. Schkuhr Car. n. 82. tab. O. fig. 56.

92. C. *ustulata**: spicis ovalibus, pedunculis exsertis retrocurvis, bracteis laxe vaginantibus subaphyllis distantibus, capsulis ovalibus acuminatis utrinque planiusculis acutissangulis rostellatis atris ore bidentato, spica mascula oblonga recurvata.—*C. atrofusca* Schkuhr Car. n. 90. tab. Y. fig. 82.

Hab. in alpibus Lulensibus, *Swartz*; et Pitensibus, *Solander*; nec non in Islandia, *Koenig*, secundum *Schkuhr.*

93. C. *laxa**: spicis exserte pedunculatis oblongo-ellipticis subdensifloris pendulis, bracteis longiuscule vaginantibus subanguste foliolatis remotis, squamis obtusis æquantibus, capsulis oblongo-ellipticis obtusiusculis tri-

quetro-depressis obtusangulis ore integerrimo, *culmo* flaccido.

Hab. in ripis turfosis lacuum circa Enontekis Lapp. Tornensis.

Obs. Spicis femineis C. limosæ satis convenit.

94. C. *latifolia:* spicis subexsertis angustissimis subsparsifloris, bracteis longissime vaginantibus subaphyllis remotis, capsulis elongato-cuneiformibus triquetris apice excurva integerrima, foliis latissimis.—*C. latifolia* Gærtner, Schkuhr Car. n. 88. tab. U. fig. 70.

Hab. in Virginia; secundum herbarium Cel. *Thunbergii.*

95. C. *pilosa*: spicis exserte pedunculatis linearibus sparsifloris, bracteis vaginantibus foliolatis remotis, capsulis subovalibus acutis ore hyalino bilobo, foliis ciliatis.—*C. pilosa* Scop. Schkuhr Car. n. 78. tab. M. fig. 49.

Hab. in Moravia &c. In herbario Cel. *Swartzii* vidi.

96. C. *panicea*:* spicis subexserte pedunculatis laxis sparsifloris, bracteis vaginantibus foliolatis subremotis, capsulis subglobosis subinflatis obtusis ore integerrimo.—*C. panicea* Linn. Schkuhr Car. n. 93. tab. L l. fig. 100.

97. C. *binervis*:* spicis incluse pedunculatis oblongis, bracteis vaginantibus angustissime foliolatis remotiusculis, squamis subæquantibus hyalino-marginatis, capsulis ovali-oblongis patentibus teretibus breviter rostratis ore bilobo hyalino.—*C. binervis* Smith in Linn. Transact. —*C. speirostachya mihi* olim *C. distans Suecorum* olim.

Hab. in Anglia, unde missa a Cl. *Turnero* Cl. *Swartz*; et in pratis subhumidis Sueciæ temperatioris ubique.

98. C. *præcox*:* spicis subpedunculatis oblongis, bracteis brevissime vaginantibus cuspidatis subdistantibus, squamis oblongo-ellipticis fulvo-castaneis longiusculis, capsulis ovalibus subtriquetris acutis pubescentibus.—*C. præcox* Jacquin Flor. Austr. Schkuhr Car. n. 39. tab. F. fig. 27.

Hab. in pratis apricis siccis.

99. C. *alpestris:* spicis subpaucifloris infima longissime exserte pedunculata superioribus subpedunculatis, bractea infima radicali foliata superioribus spicæ masculæ subapproximatis brevissime vaginantibus cuspidato-subfoliolatis, capsulis oblongo-turbinatis triquetris apiculatis subpubescentibus ore unilobo.—*C. alpestris* Allion.—*C. gynobasis* Villars. Schkuhr Car. n. 59. tab. G. fig. 35. Hab. in alpibus Helveticis.

100. C. *firma:* spicis exserte pedunculatis strictis oblongis submultifloris, bracteis breviter vaginantibus subfoliolatis subremotis, capsulis oblongo-lanceolatis attenuato-rostellatis acute serrulateque marginatis ore unilobo.—*C. firma* Host. Schkuhr Car. n. 69. tab. O. Y. fig. 54.
Hab. in alpibus Austriacis. In herbario Cel. *Swartzii* eam examinavi.

101. C. *tristachya:* spicis femineis duabus incluse subpedunculatis subsparsifloris linearibus, bracteis vaginantibus breviter subfoliolatis confertis, capsulis oblongo-subcuneiformibus depressis subexcurvis emarginatis, spica mascula duplo longiore squamis suborbiculatis crassiusculis.—*C. tristachya* Thunberg Flor. Jap. Schkuhr Car. tab. W w. fig. 109.

102. C. *verna:* spicis exserte pedunculatis ovalibus, bracteis brevissime vaginantibus foliolatis distantibus, squamis late ovatis obtusis, capsulis ovalibus apiculatis ore obtuse unilobo, culmo acutangulo.—*C. verna* Schkuhr Car. n. 74. tab. L. fig. 46.
Hab. in Helvetia.

C. Vaginatæ aphyllæ i. e. bracteis vaginantibus aphyllis instructæ.

103. C. *clandestina:* spicis subsessilibus inclusis paucifloris, bracteis vaginantibus superne hyalinis ampliatis aphyllis remotis, squamis magnis, capsulis subglobosis

basi elongatis pilosiusculis, foliis filiformibus.—*C. clandestina* Gooden. Schkuhr Car. n. 67. tab. K. fig. 43.

104. C. *alba* *: spicis longiuscule exserte pedunculatis sparsifloris paucifloris, bracteis vaginantibus hyalinis aphyllis remotiusculis, squamis brevibus, capsulis subglobosis cum acumine, foliis setaceis.—*C. alba* Scop. Schkuhr Car. n. 81. tab. O. fig. 55.

105. C. *digitata* *: spicis exserte pedunculatis sparsifloris subpaucifloris, bracteis vaginantibus aphyllis subdistantibus, squamis æquantibus, capsulis cuneiformibus basi elongatis pilosiusculis, culmo compresso.—*C. digitata* Linn. Schkuhr Car. n. 63. tab. H. fig. 38.

β. spicis subsessilibus paucifloris patentibus, bracteis brevissimis confertis, squamis subbrevibus, capsulis obovatis pilosiusculis, culmo incurvo, foliis angustis.—*C. pedata* Schkuhr Car. n. 62. tab. H. fig. 37. (nec Linnéi, quæ adhuc ignota est !)

Hab. in pratis subhumidis Gothlandiæ.

D. Amplexæ s. Subamplexæ, i. e. bracteis amplectentibus s. subamplectentibus præditæ.

106. C. *supina*: spicis femineis subbinis subsessilibus globosis, bracteis subamplectentibus squamaceis confertis, capsulis subglobosis rostellatis ore bilobo, spica mascula tenui, culmo debili, foliis angustissimis.—*C. supina* Willdenow.—*C. glomerata* Schkuhr Car. n. 65. tab. I. fig. 41.

107. C. *varia*: spicis femineis paucifloris subsessilibus: mascula tenui, bracteis subamplectentibus squamaceis subapproximatis, squamis acuminatis mucronatis longiusculis, capsulis ovali-ventricosis triquetris subacutangulis hispidulis rostro breviusculo subulato bifido, foliis angustissimis.—*C. varia* Willdenow in litteris ad *Swartz*. Hab. in America boreali.

108. C. *tomen-*

108. C. *tomentosa**: spicis subpedunculatis subcylindraceis, bracteis auriculis amplectentibus foliolaceis subapproximatis, squamis acutis, capsulis globosis tomentosis. —*C. tomentosa* Leers. Schkuhr Car. n. 57. tab. F. fig. 28.

Hab. in Germania rarius e. g. ad Herbornam, Berolinum et Wittenberg; in Gothlandiæ vero pratis fertilibus ubique copiose.

109. C. *montana**: spicis subpaucifloris subsessilibus, bracteis confertis subsquamaceis lateribus scariosis amplectentibus dorso cuspidato, squamis piceis mucronatis æquantibus, capsulis ovali-cuneiformibus triquetris subacutangulis asperellis, foliis angustissimis.—*C. montana* Linn. Schkuhr Car. n. 58. tab. F. fig. 29.

Hab. ad lucos pratorum amœnissimorum per Uplandiam &c.

110. C. *ericetorum**: spicis subsessilibus subglobosis, bracteis amplectentibus squamaceis totis coloratis subconfertis, squamis rotundatis fuscis æquantibus marginibus hyalinis laceris, capsulis ovali-globosis basi elongatis obtusiusculis pubescentibus, spica mascula clavata.—*C. ericetorum* Schrank.—*C. ciliata* Willden. Schkuhr Car. n. 66. tab. I. fig. 42.

Hab. in collibus elevatis sterilissimis sabulosis.

111. C. *globularis**: spicis subsessilibus ovatis: mascula tenui, bracteis subamplectentibus subfoliaceis distantibus, squamis subbrevibus, capsulis ovali-ovatis acutis asperis, culmo laxo, foliis angustissimis.—*C. globularis* Linn.

Hab. in humidiusculis sylvarum Sueciæ septentrionalis, vulgaris.

112. C. *pilulifera**: spicis subsessilibus globosis, mascula tenui, bracteis subamplectentibus attenuate subfoliolaceis approximatis, squamis mucronatis longiusculis, capsulis subglobosis acutis pubescentibus, culmo debili serrulato. —*C. pilulifera*

—*C. pilulifera* Linn. Willdenow. Schkuhr Car. n. 46. tab. I. fig. 39.

Hab. in sylvaticis siccioribus.

113. C. *alpina**: spicis ternis subpedunculatis subglobosis pseudandrogynis, bracteis subamplectentibus subfoliolaceis approximatis, squamis aterrimis, capsulis subpubescentibus apiculatis.—*C. alpina* Swartz. Liljeblad Succ. Flor.—*C. Vahlii* Schkuhr Car. n. 72. tab. G g. fig. 91. —*C. montana* Flor. Dan. 403.

Hab. in graminosis infra alpinis Lapponiæ.

Obs. Egregie varians est et difficillime determinatur, etiamsi distinctissima.

114. C. *atrata**: spicis pedunculatis cylindraceis pseudandrogynis subcernuis, bracteis subamplectentibus foliolaceis subdistantibus, capsulis subrotundo-ovalibus depressis acutangulis apiculatis ore bilabiato, foliis latis.—*C. atrata* Linn. Schkuhr Car. n. 44. tab. X. fig. 77.

β. C. *magellanica*: spicis cernuis oblongis, squamis rufis, culmo laxo serrulato, foliis subangustis.—*C. magellanica* Lamarck. Schkuhr Car. tab. N. fig. 51.

Hab. in America; secundum herbarium Cl. *Torneri*.

115. C. *flacca**: spicis pedunculatis subcylindraceis flaccidis: masculis subbinis bracteis amplectentibus subfoliaceis subdistantibus, capsulis obovato-globosis obtusis subasperellis ore integerrimo.—*C. flacca* Schreb. Schkuhr Car. n. 98. tab. O. P. fig. 57. a. b.—*C. recurva* Gooden.

116. C. *geminata*: spicis geminatis sublonge pedunculatis cylindraceis pendulis, masculis pluribus, bracteis amplectentibus longe foliaceis distantibus, capsulis ovato-globosis cum acumine.—*C. geminata* Schkuhr Car. n. 53. tab. W. P p. fig. 75.

Hab. in Nova Zeelandia? *Forster*.

117. C. *Pseudocyperus**: spicis pedunculatis cylindraceis crassis pendulis, bracteis subamplectentibus longe foliaceis subapproximatis, squamis setaceis, capsulis ol-

longis acuminato-rostratis reflexis triquetris bicuspidatis. —*C. Pseudo-cyperus* Linn. Schkuhr Car. n. 25. tab. Mm. fig. 102.

118. C. *prasina:* spicis subbreviter pedunculatis linearibus basi elongatis laxis, bracteis subamplectentibus foliaceis subdistantibus, squamis ovali-ellipticis mucronatis, capsulis oblongis depressis apiculatis ore bidentato, culmo acutissangulo.

Hab. in America boreali, *Kjellman;* ex herbario *Bergiano.*

119. C. *japonica:* spicis pedunculatis ovalibus, bracteis subamplectentibus foliaceis distantibus, squamis oblongis brevibus, capsulis oblongis attenuato-rostratis patenti-divergentibus ore bidentato.—*C. japonica* Thunberg Fl. Jap. Schkuhr Car. tab. W w. fig. 110.

120. C. *leonura:* spicis pedunculatis flagelliformibus flexuosis nutantibus, bracteis subamplectentibus longissime foliaceis distantibus, squamis cuspide longa divergente, capsulis subglobosis apiculatis ore integerrimo.

Hab. in Pennsylvania, *Hultgren;* ex herbario *Thunbergiano.*

121. C. *pallescens*:* spicis pedunculatis subcylindraceis nutantibus, bracteis subamplectentibus subfoliaceis subdistantibus, capsulis ovali-ellipticis obtusissimis teretibus.—*C. pallescens* Linn. Schkuhr Car. n. 92. tab. K k. fig. 99.

122. C. *limosa*:* spicis longe tenuissimeque pedunculatis oblongis subangustis subdensifloris pendulis, bracteis subamplectentibus subsetaceis subdistantibus, squamis subacutiusculis æquantibus, capsulis ovatis obtusiusculis triquetro-depressis acutangulis, culmo laxo subacutangulo, foliis angustissimis marginibus incurvis.—*C. limosa* Linn. Schkuhr Car. tab. T t. fig. 107.

Hab. in paludibus limosis profundissimis.

β. C. *irrigua:* spicis subcylindraceis crassiusculis nutantibus,

tibus, pedunculis longiusculis ancipitibus, bracteis subamplectentibus anguste foliolaceis subapproximatis, squamis acuminatis longis rufis, capsulis orbiculatis acutissangulis, culmo stricto acutangulo, foliis subangustis marginibus subrecurvis.

Hab. locis irriguis et inundatis per Sueciam septentrionalem.

γ. C. *rariflora:* spicis sublinearibus subsparsifloris, pedunculis longiusculis retrocurvis, bracteis ligula amplectentibus subsetaceis subapproximatis majusculis, squamis subcircinatis piceis, capsulis ovato-suboblongis triquetro-depressis obtusiusculis obtusangulis, stylo exserto, squamis masculis ovalibus; culmo subobtusangulo, foliis angustis marginibus recurvis.

Hab. in locis irriguis infra alpinis per Nordlandiam septentrionalem.

δ. C. *livida:* spicis subbreviter pedunculatis paucifloris, bracteis amplectentibus foliaceis infima remotissima, squamis oblongis obtusiusculis subæquantibus, capsulis ovato-suboblongis triquetro-depressis obtusiusculis obtusangulis, culmo teretiusculo, foliis angustis marginibus subincurvis.

Hab. in paludibus ad fontes sylvestres Lapponiæ Enontekensis.

Obs. Hæ varietates persistentes sunt, vix tamen diversæ species. Differentiam iis communem dare nequeo.

123. C. *trifida:* spicis subsessilibus sublanceolatis crassissimis, masculis pluribus, bracteis subamplectentibus late longeque foliaceis subdistantibus, squamis longiusculis truncatis retusis cuspide longa ciliata, capsula oblongo-ovata bidentata.—*C. trifida* Cavanilles Icon. vol. 5. p. 41. tab. 465.

Hab. in insulis Falklandicis Americæ meridionalis.

124. C. *vesicaria*:* spicis subbreviter pedunculatis cylindraceis crassissimis subbrevibus cernuis, masculis pluribus, bracteis subamplectentibus longe foliaceis distantibus,

squamis lanceolatis, capsulis oblongo-ovatis inflatis acuminatis subulato-rostratis bicuspidatis patentibus, culmo acutangulo, foliis latiusculis.—*C. vesicaria* Linn. Schkuhr Car. n. 103. tab. S s. fig. 106.

β. C. *plumbea:* spicis crassis, bracteis longissime foliaceis subremotis, squamis ovato-oblongis cuspide capsulam superante, capsulis ovali-ovatis acuminatis ore bifurcato. Hab. ad Caucasum, *Steven*; secundum herbarium Cel. *Swartzii.*

125. C. *ampullacea* * : spicis subbreviter pedunculatis cylindraceis crassis laxis, masculis pluribus, bracteis amplectentibus foliaceis distantibus, squamis lanceolatis, capsulis subglobosis inflatis setaceo-rostratis divergentibus, culmo obtusangulo, foliis subangustis marginibus incurvis.—*C. ampullacea* Gooden. Schkuhr Car. n. 104. tab. T t. fig. 107.

126. C. *riparia* * : spicis subbreviter pedunculatis cylindraceis crassis, masculis pluribus, bracteis subamplectentibus latissime longissimeque foliaceis remotis acuminato-subcuspidatis longiusculis, capsulis oblongo-ovatis subinflatis acutis rostello bifurcato.—*C. riparia* Curtis. Gooden. Schkuhr Car. n. 102. tab. Q q. fig. 105.

127. C. *paludosa* * : spicis breviter pedunculatis cylindraceis, bracteis subamplectentibus foliaceis distantibus, squamis subbrevibus mucronatis, capsulis ovali-oblongis acutis triquetro-depressis acutangulis nervosis ore bidentato.—*C. paludosa* Gooden. Schkuhr Car. n. 101. tab. O o. fig. 103.—*C. tephrostachya mihi* olim.

Hab. in prato humido Gothlandiæ, nec ullo alio loco per Sueciam adhuc visa.

128. C. *fasciculata:* spicis subsessilibus linearibus, masculis pluribus, bracteis subamplectentibus foliaceis longis, squamis ellipticis longis, capsulis ovalibus rostratis marginibus ciliatis ore subdiviso.—*C. fasciculata* Link Flor. Lusitan. Schkuhr Car. n. 99. tab. Z z. fig. 114.

129. C. *Buxbaumii* * : spicis pseudandrogynis subsessilibus

oblongis, bracteis subamplectentibus foliaceis distantibus, squamis subæquantibus cuspidatis, capsulis ovali-oblongis obtusiusculis triquetro-depressis ore bidentato.—*C. polygama* Schkuhr Car. n. 70. tab. X. G g. fig. 76.—*Buxbaum* Cent. 4. p. 33. tab. 59.

Hab. in paludosis Sueciæ, e. g. in Stormossan ad Oesthammar, et in Lapponia ubique.

130. C. *bina:* spicis pseudandrogynis binis subsessilibus ovalibus, bracteis subamplectentibus squamaceis approximatis, squamis ellipticis obtusis, capsulis obovatis triquetris apiculatis ore bidentato.—*C. bina* Schkuhr Car. n. 26. tab. G. fig. 33.

Hab. in Bohemia?

3. Distigmaticæ et spicis simplicibus sexu distinctis instructæ, nec non bracteis subamplectentibus.

131. C. *paleacea:* spicis cylindraceis, masculis pluribus, floribus distigmaticis, pedunculis longis reclinatis, bracteis foliaceis distantibus, squamis cuspide longa serrata terminatis, capsulis suborbiculatis apiculatis ore emarginato, culmo laxo.—*C. paleacea* Schreb. in Mühlenb. Act. Amer.?

Hab. in America boreali; secundum herbarium Cl. *Torneri.*

132. C. *maritima*:* spicis longe pedunculatis pendulis cylindraceis, masculis pluribus, floribus distigmaticis, bracteis foliaceis distantibus, squamis longe cuspidatis, capsulis suborbiculatis apiculatis ore emarginato, foliis latiusculis.—*C. maritima* Fl. Dan. 704. Schkuhr Car. n. tab. W. fig. 74.

Hab. in litoribus Norvegiæ meridionalis et Bahusiæ.

133. C. *cuspidata*:* spicis subbreviter pedunculatis oblongo-cylindraceis, floribus distigmaticis, bracteis foliaceis subdistantibus a spica mascula remotis, squamis

longiuscule cuspidatis, capsulis suborbiculatis apiculatis ore emarginato, foliis mollibus marginibus subincurvis.

Hab. in litoribus limosis maris septentrionalis Nordlandiam Norvegicam alluentis.

134. C. *salina*: spicis subbreviter pedunculatis oblongo-cylindraceis, floribus distigmaticis, bracteis foliaceis subremotis, capsulis suborbiculatis majusculis apiculatis ore emarginato, foliis mollibus marginibus incurvis, vaginis perlongis subæqualibus.

Hab. in litoribus maris per Nordlandiam et Finmarkiam Norvegiæ.

135. C. *aquatilis**: spicis breviter pedunculatis sublinearibus superne incrassato-clavatis, floribus distigmaticis, bracteis longe foliaceis remotiusculis, capsulis sublentiformibus subparvis apiculatis ore integerrimo, culmo firmo obtusangulo, foliis strictis marginibus incurvis, vagina intima subbreviore.

Hab. intra ripas fluviorum per Lapponiam.

β. C. *nardifolia*: spicis subsessilibus brevibus, mascula lineari, bracteis foliaceis distantibus, squamis rotundatis crassiusculis subæquantibus, capsulis ovatis superne utrinque planiusculis subacutis ore protruso, foliis angustissimis subconvolutis.

Hab. in aquosis alpium Lapponicarum.

136. C. *acuta**: spicis breviter pedunculatis sublongis subdensifloris sublaxis, masculis pluribus, floribus distigmaticis, bracteis longe foliaceis remotiusculis, capsulis ovalibus tumidulis obtusis ore protruso, culmo acutangulo serrulato laxo, foliis laxis.—*C. acuta* Goodenough. Schkuhr Car. n. 50. tab. F f. fig. 92. b.—*C. gracilis* Curtis.

137. C. *hispida*: spicis subsessilibus cylindraceis valde densifloris, masculis pluribus, floribus distigmaticis, bracteis longe foliaceis remotiusculis, squamis æquantibus mucronatis, capsulis obovatis marginibus hispidis

apiculo subbidentato, foliis latis.—*C. hispida* Willden. apud Schkuhr Car. n. 51. tab. S. fig. 64.

Hab. in Barbaria.

138. C. *stricta*:* spicis subsessilibus ovato-lanceolatis acutis valde densifloris, masculis binis, floribus distigmaticis, bracteis latiuscule foliaceis subdistantibus, squamis subparvis, capsulis ovatis subacutis superne utrinque planis ore protruso, culmo acutangulo stricto, foliis subbrevibus strictis.—*C. stricta* Gooden. Schkuhr Car. n. 49. tab. V. fig. 73.

Hab. in Anglia, nec non Uplandia Sueciæ.

139. C. *cæspitosa*:* spicis subsessilibus subbrevissimis, mascula suboblonga, floribus distigmaticis, bracteis setaceo-subfoliolatis subapproximatis auriculis majusculis basi confluentibus, squamis parvis albo-marginatis, capsulis late ovalibus superne utrinque convexis obtusis ore protruso, culmo acutissangulo serrulato flaccido, foliis angustis longis flaccidis.—*C. cæspitosa* Linn. Gooden. Schkuhr Car. n. 48. tab. B b. fig. 85. c. d.

140. C. *saxatilis* :* spicis subsessilibus subdensifloris obtusissimis, mascula ovali squamis circinatis albo-marginatis, floribus distigmaticis, bracteis angustissime foliolaceis distantibus auriculis majusculis, squamis subæquantibus, capsulis oblongo-ovalibus superne utrinque planis acutiusculis subexcurvis ore æquali.—*C. saxatilis* Linn.

141. C. *rigida:* spicis subsessilibus oblongo-cylindraceis valde densifloris, floribus distigmaticis, bracteis subdistantibus inferiore foliacea recurva auriculis parvis, squamis subcircinatis, capsulis subglobosis apiculatis, foliis latiusculis rigidis recurvis.—*C. rigida* Gooden. Schkuhr Car. n. 47. tab. U. fig. 71.

Hab. in summis montibus Scotiæ.

142. C. *pulla*:* spicis pedunculatis oblongis, floribus distigmaticis, bracteis amplectentibus foliaceis remotiusculis,

culis, squamis oblongis, capsulis subglobosis apiculatis, ore subbilobo.—*C. pulla* Gooden. in Linn. Transact.—*C. fusca* Schkuhr Car. n. 52. tab. C c. fig. 88.—*C. globularis var.* Vahl.

Hab. in montibus Scotiæ, missa a Cl. *Turnero* ad Cl. *Swartz*; in alpibus Lapponicis *Vahl*, *Solander*, et *ipse* anno 1802. in Raste-kajse Finmarkiæ orientalis.

Observations on Plate VIII.

Respecting the ovate figure, it should be observed, that *ovata* alone does always imply *ovali-ovata*, as by *elliptica* alone *ovali-elliptica* is understood.—Some botanists may perhaps consider the elliptic form of less necessity as a botanical term, and indeed we find that Linnæus in his Flora Lapponica makes use of that term in the same meaning with ovalis; and in Hortus Cliffortianus, we generally find *ovalis*, but the figures show an exact elliptical form. Thus *ovalis* and *elliptica* are synonymous in Linnæus's works till the year 1756, when in his dissertation, *Centuria secunda plantarum, p.* 9. (*Amœn. Acad. vol. iv. p.* 305.) he applies to the term *ellipticus* a new and distinct signification. After that time he often applied the term both in the Amœnitates Academicæ and Species Plantarum, as also last of all in the Mantissa Plantarum altera; and Linnæus the son made frequent use of it, as well by itself as compounded with others in the Supplementum Plantarum; a proof that neither of them considered it as unnecessary. We might indeed express, for instance, *ovali-elliptica* by *oblonga ad utramque extremitatem rotundata*, and *oblongo-elliptica* by *lanceolata ad utramque extremitatem rotundata*, were it not rather contradictory, as the length is less than it should be in an oblong and lanceolate figure. Besides this we have, for instance in *Carex filiformis*, the capsule elliptic, and at the same time *rostellata*, which can scarcely be expressed without an application of the elliptic figure.

Fig. 43. Capsula *C. pallescentis* ore integerrimo.

44. Capsula *C. sparteæ* et (*b*) *C. cuspidatæ* ore emarginato.

45. Capsula *C. glareosæ* sinu oris disrupto, et *C. Heleonastis* sinu oris rimæformi.

46. Capsula *C. Lagopinæ* ore bilabiato.

47. Capsula *C. binervis* ore bilobo, et (*d*) *Caricis Castaneæ* ore bilobo.

48. Capsula *C. arcuatæ* ore bidentato, et (*e*) *C. distantis* ore bimucronato.

49. Capsula *C. drymejæ* ore diviso.

50. Capsula *C. intermediæ* ore bifido.

51. Capsula *C. hirtæ* ore bicuspidato.

52. Capsula *C. filiformis* ore bifurcato.

53. Capsula *C. pumilæ* ore bicorni.

55. Transversal section of the capsule of *C. drymejæ*, to show its triangular form, and the marginal nerves on the sides.

56. Transversal section of a capsule of *C. distans*, to show its marginal nerves.

57. Transversal section of capsula triquetro-depressa of *C. laxa*.

58. Transv. section of capsula depressa *C. ustulatæ*.

59. Tr. section of capsula lenticularis of *C. brunneæ*.

60. Tr. section of capsula teres *C. vesicariæ*.

61. Tr. section of capsula obtusangula nervosa of *C. capensis*.

62. Tr. section of capsula subacutangula *C. tenuifloræ*.

65. Tr. section of capsula acutangula marginibus obtusis *C. lagopinæ*.

66. Tr. section of capsula obtusangula marginibus acutis of *C. dioica*.

Fig. 67. Tr. section of capsula marginibus extenuatis *C. gibbæ.*

68. Tr. section of capsula marginibus membranaceis *C. tribuloidis.*

69. Capsula subexcurva *C. capensis.*

70. Capsula excurva *C. heterospermæ.*

71. Capsula recurva *C. Forsteri.*

X. *First Memoir on the general Characters of Families of Plants, derived from the Seeds, as confirmed or corrected by the Observations of* Gærtner. *By* A. L. DE JUSSIEU *.

As long as botany, founded upon arbitrary principles, was only the science of naming plants, and of forming artificial methods proper to fulfil this intention, it was not necessary to examine minutely all the parts of vegetables. A small number of characters, that would serve to define the object to be distinguished, sufficed; and of these the most external and evident, as being most easily observed, were always preferred. Tournefort principally used the corolla; but Linnæus, better informed of the importance of the stamens and pistils, by the discoveries of his predecessors, made great use of these parts to increase the number of characters. Both these botanists framed very ingenious systems, by the aid of which plants arranged according to their order of agreement could be found out with facility. Other systems, directed to the same end, preceded or followed these, but were not used beyond the country where they were invented, and soon yielded to that system under which all the known vegetables were arranged in properly defined classes.

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* Annales du Muséum d'Histoire naturelle, vol. v. p. 216.

For some time botany, conducted upon these principles, made no further progress, being wholly occupied in arranging the newly discovered plants. The number of materials augmented every day; but these were only arranged in proper order to be easily found whenever they should be wanted for rearing the edifice of true science on a firm and unchangeable basis. It was soon perceived that this science did not consist in the mere naming of plants, but that its professors should be occupied in the study of their nature, that is to say, their entire organization. It was no longer permitted to overlook any one character, or to be content with a small number of such as might suffice for mere designation. Every character was now to be studied; they were compared one with another; their different degrees of importance weighed; their relative value thence deduced; and according to this determined value the affinities of plants were established, and the study of these affinities became the principal object of the botanist. Each organ being now better examined, both externally and internally, its situation and structure afforded new characters, more or less essential, which were used with advantage in determining the affinities.

It is more especially in the fruit and seeds that useful discoveries have been made. Grew, in the seventeenth century, had already observed, in some seeds, a particular substance formed by the thickening of a mucilaginous fluid contained in its membranous envelopes. He named this substance the *albumen*, comparing it both in its nature and use to the substance bearing the same name in eggs. This observation, so interesting in vegetable physiology, had not struck the systematic writers sufficiently to induce them to make any use of it in their characters; but as soon as the necessity of examining the entire organization of vegetables was acknowledged, in order to bring together those that resembled one another in the greatest number of their parts, the seed, which contains the rudiments of the vegetable and all its organs, not yet developed, could not fail to be better studied. It was easy to perceive that in similar plants, members of the same family, there generally was a great conformity in the internal structure of their seeds. M. Adanson, in his *Familles des Plantes*, published in 1763, often points out the presence of this substance in the seed, as one of the general characters of certain plants. Before him Bernard de Jussieu had made the same observations, which afforded him the means of defining the families he had established in 1759, in the garden at Trianon, but he did not publish any thing on the subject. Neither did I neglect this character when in 1773 I published a memoir on the family of Ranunculi in the Transactions of the Academy of Sciences.

From this epocha it was perceived "that all seeds of the same plant, and all of the same genus, have the embryo situated in the same manner; and that this conformity generally occurs even in all the plants of families allowed to be very natural; that the compound flowers have a seed filled by the embryo; that umbelliferous plants always have a hard compact horn-like substance, enclosing the embryo at its summit; that the embryo in the grasses is situated at the base of a farinaceous substance, which it does not penetrate; that in the Ranunculi this organ is lodged in a cavity formed in the upper part of a horny substance, that occupies the whole interior of the seed." This structure of the seeds being similar in several families, leads to the presumption that it is equally so in every other, and that no family can be natural, if the situation and structure of the embryo be not the same in all its genera, and also that a similarity in this organ is often sufficient to indicate an affinity in the other parts, and to point out natural approximations. Thus it is observed that Alisma and Sagittaria, associated by Linnæus and Adanson with the Ranunculi,

culi, which they resemble in some exterior marks, are in reality very distant, because their embryo is monocotyledonous, and wants the horny substance peculiar to this family; at the same time these same characters call to this family Nigella and Garidella, which Adanson had united with the Cisti.

Well convinced of the necessity of studying this part, and the advantage which might result from that study in acquiring a knowledge of the affinities of plants, I spent several months in dissecting seeds; and having committed my different observations to paper, I used them in 1774, in framing a new series of families in the school of the Jardin des Plantes. Whilst I was employing myself in this pursuit, Gærtner had already commenced his, in 1769 *: he had also perceived the necessity of studying the fruit and seeds, and seems to have foreseen that this study would lead to a revolution in the science, and procure a better distribution of vegetables. His first volume, containing five hundred observations, appeared in 1788, the same year that I began to print my genera of plants disposed in families, which was not finished till the next. The characters of these families almost always contain some general observations on the structure and situation of the seed, on the presence or absence of the substance which Grew called the albumen, and which I distinguished by the name of *perisperm*, that is to say, surrounding the embryo, to avoid confounding it with the albumen of animals. In this series of characters, drawn from the seed, there occur some omissions, some conclusions too general, and a small number of inaccurate observations. A part of these omissions and mistakes would have been avoided, had the work of Gærtner appeared sooner. His observations, to which he added more than five hundred others on the same plan, published in a second volume in 1791, might have been added to those which formed the basis of my work, and would have occasioned some changes in the approximation of plants, and in the disposition of the families. In order to derive every possible advantage to the science of affinities from the discoveries of this great botanist, it would be useful to collect at the end of each family all the observations that belong to it, as well those that confirmed as those that were opposed to the announced definitions. Such is the object of the present memoir, in which, beginning with the dicotyledonous plants, I shall collect all the observations of Gærtner relative to such as are apetalous, and placed first in this great division.

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* In the first volume of these Annals there is an interesting memoir on the life and writings of this celebrated author, by M. Deleuze.

These plants have already been distributed into three classes, according to the relative situation of the sexual organs, or, which comes to the same, the insertion of the stamens. These are either epigynous, i. e. inserted on the pistil; hypogynous, growing from the part which supports the pistil; or perigynous, inserted in the calyx.

The class of epigynous insertions in the apetalous plants includes only the family of Aristolochiæ, of which, for want of observations, I had not announced the character of the seed. I was contented to arrange them among the dicotyledones, although my uncle had, with some hesitation, from observing their organization to be different, placed them near to the Filices. Gærtner has examined the seeds of two species of Aristolochiæ, and of one species of Asarum, and found a cartilaginous albumen or perisperm, occupying the whole interior, with a little cavity at the navel, filled by an embryo, so delicate that he could not distinguish its lobes, at least he makes no mention of them in his description. It follows that this observation of Gærtner does not determine in which of the two grand divisions of the vegetable kingdom this family should be ar-

ranged;

ranged; and it is not surprising that Bernard de Jussieu should hesitate upon this point. We should have experienced the same difficulty had we not seen an Aristolochia germinate, which showed two distinct cotyledons. This fact is also confirmed by the observation of Desfontaines, who, after proving that concentric layers and medullary prolongations are a kind of organization peculiar to the stalks of dicotyledonous plants, remarks that these layers and these medullary prolongations do occur in Aristolochia. We may conclude from the analogy of its exterior form, that the same organization takes place in Asarum. It is also probable that the Hypocistus, referred to the Aristolochiæ, from the character of its flower, has a similar conformation; which might be easily verified in the southern provinces of France, where this plant grows naturally upon the Cisti.

Next to this first class follows that in which the stamens are inserted into the calyx. The families composing this class are the Elæagni, or Osyrides, the Thymeleæ, or Daphnoideæ, the Proteæ, the Lauri, the Polygoneæ, and the Atriplices.

The order of Elæagni, characterized especially by an adherent ovary, has been divided into two sections, the one having five stamens or fewer, the other ten. Not having observed any perisperm either in Elæagnus or in Osyris, both of which I had examined, I concluded that this substance was wanting in the whole family. But Gærtner informs us that Thesium has a cylindrical embryo, with a long and ascending radicle, placed in the centre of a fleshy perisperm, and hence this genus ought to be separated from this family; at the same time we are not able to point out the family with which it agrees better. The same will hold true with regard to Nyssa, which, according to M. Richard, presents a similar organization, differing chiefly in the form of its embryo, of which the lobes are

larger

larger and compressed. In Osyris and Elæagnus I have observed the radicle ascendant, or directed towards the tip of the fruit. In Conocarpus erecta Gærtner says that the radicle is descendent, or directed towards the peduncle; which may establish a slight difference between this genus and the two preceding. Hippophae was placed in the same family from supposing it to have an adhering ovary; but Gærtner and M. Richard assure us that the ovary is free or superior, and covered by the calyx, which does not adhere to it. Gærtner adds that the internal integument of the seed has a fleshy lamina, and that the radicle of the embryo is descendant. From the situation of the fruit this genus might be referred to the Thymeleæ, but the direction of the radicle is rather against it. These different observations seem to prove that the elements of several families are united in this first section.

The second section of Elæagni, which contains Terminalia, Bucida, and other analogous genera, and which is characterized by the number of ten stamens, offers a singular conformation in its seed common to all the genera. The embryo, destitute of perisperm, has always the lobes thin, leafy, and turned spirally round the radicle, in which it is in a manner wrapped up. This character, observed by Gærtner in three species of Myrobalanus, in his Badamia and Catappa (two species of Terminalia), and in Gyrocarpus, has been since seen also in Bucida, and in the *Fatre* of Madagascar, of which I shall form a new genus under the name of *Fatrea*. Gærtner has found this organization also in Conocarpus racemosa, badly united to this genus, from which it differs also in having stamens more numerous, and spiked flowers. These different observations ought necessarily to lead to a new family of Myrobalani, which may easily be defined by the number of stamens and the structure of the embryo. To this family must be referred all the genera of this second section, and those in which Gærtner has observed the same conformation. We now see where Gyrocarpus ought to be placed, the affinity of which could not be hitherto determined; and we are convinced that Conocarpus racemosa ought to form a new genus. This new family has some affinity to the Myrtoideæ, that are furnished with ten stamens and a single seed, such as Combretum, Caccucia, &c. But these last differ sufficiently by the presence of petals, and the straight lobes of the embryo.

The want of a perisperm, the straight embryo with its radicle ascendant, are characters pointed out as proper to the family of Thymeleæ, which agrees in this point with the Elæagni, from which it differs only in having an ovary detached from the calyx. Gærtner has also seen the radicle ascendant in Daphne, Stellera, Dais, and his new genus Pimelea, evidently belonging to this family; but having observed that there is no perisperm in Daphne, and that the seed of Stellera presents only a fleshy lamina, attached to its internal membrane, he announces in Dais and Pimelea a very delicate perisperm.

May we not conclude that the perisperm in these two genera is only a thickened membrane, like that of Stellera, and that the first character remains unshaken? Schleranthus and Mniarum (Ditoca of Gærtner) have some external resemblance to the Thymeleæ, and especially to Pimelea; but their embryo, which according to Gærtner is bent in a ring round a farinaceous perisperm, will not allow of their being admitted into this order: they may have more affinity with the Atriplices, if it be not still better to allow them to remain with the Portulaceæ.

The Proteæ, which like the Thymeleæ have no perisperm, differ from these in having the radicle of the embryo descendant. This double fact is confirmed by the observations of Gærtner on Banksia and Protea argentea: neither could M. Richard find any perisperm in Rupala, nor myself in

Gevuina of Molina, or Quadria of Ruiz and Pavon, all of which certainly belong to this family.

I had remarked in Laurus Borbonia and Laurus Sassafras an embryo without perisperm, and an ascendant radicle, impacted between the straight and entire lobes: Gærtner has observed the same in Laurus nobilis, L. Cassia, and L. Cinnamomum. We may hence with some certainty admit these characters as general in the family of Lauri. Two genera which have been added at the end of this family, as having some affinity therewith, have afforded to this author very striking differences. The embryo of Hernandia, equally naked, has the radicle ascendant, and the lobes subdivided irregularly into several fleshy portions interlaced one in another. The embryo of Myristica, examined in four species, is very small, and has thin expanded lobes, with a radicle descendant and in form of a tubercle concealed at the bottom of the cavity of a large perisperm, which is solid or soft, fleshy or sebaceous, irregularly veined in its substance. Hence it may be concluded, without examining the characters of the fructification, that the Nutmeg should form a family very distinct from the Lauri, and that Hernandia should be also separated from this family, from which it differs too in having a calyx adherent to the fruit. The genus Cassytha, which on account of some of its characters we might be tempted to join with the Lauri, is removed far from them by the observation of Gærtner, that its embryo is very small, and placed at the summit of a soft and fleshy perisperm. These characters, joined to others drawn from its fructification, equally separate this genus from the Nutmeg.

The family of Polygoneæ is easily distinguished from the foregoing by its farinaceous perisperm occupying the interior of the seed. The embryo, the radicle of which is always ascendant, is placed in the centre of this perisperm, in Coccoloba, Rheum, and Fagopyrum; by its side, in

Polygonum, Persicaria, Rumex, and Atraphaxis; and lodged in its substance, but on one side, in the new genus Brunnichia. These observations of Gærtner confirm the existence of a farinaceous perisperm in the Polygoneæ, and afford the means of separating Fagopyrum from Polygonum, with which Linnæus has united it. This family is one of the most natural and the best defined, both by the structure of the seed and the other parts of the fructification.

The Atriplices, which constitute the last family in this class, have, like the Polygoneæ, a farinaceous perisperm, around which the long cylindrical embryo is twisted in the form of an incomplete ring, and its radicle and lobes are both descendant. Gærtner has observed the same organization in Phytolacca, Rivina, Bosea, Polycnemum, Spinachia, Beta, Chenopodium, Atriplex, Blitum, Ceratocarpus, Salicornia, Corispermum and Obione (one of his new genera, formerly called Atriplex sibirica), in Axyris ceratoides Linn. or Diotis of Schreber: and this embryo, instead of forming a ring by a simple turn, is sometimes rolled on itself in a horizontal spiral, occasioning the perisperm in some measure to disappear, leaving only some delicate membranous portions in the interstices between the turns of the spiral. This structure is shown by Gærtner in Salsola and Anabasis; but according to him in Basella the perisperm is more formed than in the two last genera, but smaller than in the greater part of the Atriplices. The embryo of Petiveria is not turned round, but simply folded upon a thin long farinaceous perisperm; its radicle, straight and directed downwards, is applied against the side of this substance, and the cotyledons, broad and thin, cover the opposite side, and embrace at the lower part the radicle itself. We find here in several of the genera a great uniformity in the organization of the seed; but some difference exists in Salsola and Anabasis, and greater still in

Petiveria, but not perhaps sufficient to give the idea of a subdivision into more families.

The third class of apetalous dicotyledonous plants includes four families, in which the stamens are inserted below the pistil, the Amaranthi, the Plantagines, the Nyctagines, and the Plumbagines.

An embryo rolled in a ring round a farinaceous substance, which is the character of the Amaranthi as well as of the Atriplices, has been seen by Gærtner in Amaranthus, Celosia, Achyranthes, Gomphrena, Paronychia, and Queria canadensis, which latter now forms the genus Anychia of Michaux, united to this family in a memoir contained in the second volume of the *Annales du Muséum, p.* 133.

I had observed in Psyllium, referred to the Plantagines, a straight embryo with short lobes and a long descending radicle, which did not appear to me to be contained in a perisperm, but only in membranes somewhat thickened. Gærtner, who had examined this plant, and five species of Plantago, describes the same embryo as being enclosed in the centre of a solid and fleshy perisperm. This number of observations ought to supersede a solitary one, and the presence of a perisperm becomes one of the characters of the Plantagines.

The embryo of the Nyctagines covers entirely a central substance, which is granulated or almost farinaceous. In Pisonia it is straight, and placed on one side of the substance, which it embraces entirely with its large lobes. In Mirabilis or Nyctago, and in Boerhaavia, it is doubled back at the upper part, where the radicle and the lobes unite in such a manner, that the lobes applied to one side of the substance embrace it almost entirely, only leaving a narrow space on the opposite side, which is covered with the descending radicle. Gærtner, as well as myself, has observed this organization, which makes one of the principal characters of this family, already more detailed in the second volume of the *Annales du Muséum, p.* 269.

In the Plumbagines, which terminate this class, I have described a one-seeded capsule, covering the seed in form of a hood, detached at its base, and disclosing a thread or umbilical cord, issuing from the receptacle, and inserted into the summit of the seed; the embryo appeared to me to be straight, flattened, with its radicle ascendant, and enclosed in a perisperm almost farinaceous. **Gærtner** found also all these characters in Plumbago and Statice, with this difference, that in the latter plant he figures and describes the capsule open at the top, and the umbilical cord issuing from this opening to be inserted in the base of the seed, which has a descending radicle; but as this observation is not only contrary to mine, but also to what he has remarked himself on the analogous genus of Plumbago, it is evident that he must have examined the capsule and seed of the Statice in an inverted position, mistaking the base for the apex: the character before given ought therefore to remain.

REVIEW.

XI. *Transactions of the Linnean Society of London, Vol. VII.* London, 1804. 4to.

PERHAPS nothing has contributed more to the very high degree of respectability which the Linnean Society has already attained, than the extreme caution with which the council has proceeded in publishing its Transactions: for, with very few exceptions, no papers but those of great intrinsic worth have ever been admitted. The contents of this volume fully justify the motto, which now occurs for the first time in the title page, "*Naturæ discere mores.*" Indeed there appears so much more to praise than blame before us, that to show our impartiality we must begin with this very quotation. Many years have elapsed since we read Propertius, nor have we him now by us to refer to, but unless our memory be unusually treacherous he wrote "*perdiscere:*" here surely the brevity of the great Linné should not have been so strictly observed, especially when it is considered how forcibly he illustrated in his own writings the utility of such prepositions. The botanical papers selected for the present volume are as follow:

1. ***A new Arrangement of the Genus Aloe, with a chronological sketch of the progressive knowledge of that genus, and of other succulent genera.*** By Adrian Hardy Haworth, Esq. F.L.S.

This is the best of the author's productions we have yet examined. He has lately also written, in a much more able manner than it had been done before, the letter-press of the Botanist's Repository, a periodical work we are sorry on that account to find now given up. The genus *Alöe* is here divided into three sections, containing 51 species, besides varieties which the author has seen; and 9 dubious species taken up from the figures and descriptions of others. Among these last we have long suspected one, the Aloe Africana glabro folio &c. *Comm. Præl. p.* 76. *t.* 25. to be a *Crassula.* The first section is distinguished by the title of *Parvifloræ, corollis plerumque virescentibus laciniis sæpe revolutis:* in this he makes four subdivisions. The second section is named *Curvifloræ, corollis obclavatis curvatis corallii colore:* in which though very short, he has two subdivisions. The third section is called *Grandifloræ, corollis cylindracco-ovatis corallii colore:* in this he has five subdivisions. Though we are yet imperfectly acquainted with the species of this genus, we know enough of them to be confident that in a natural series many of these subdivisions must be given up. In so important a part of the monographia of every genus, a greater attention should invariably be paid to the flowers than the leaves; and we believe an accurate investigation of the former, even in *Alöe,* though so similar in general appearance, would discover many constant marks of distinction.

II. *On the Germination of the Seeds of Orchideæ.* By Richard Anthony Salisbury, Esq. F.R.S. and L.S.

The celebrated Jussieu, in his Genera Plantarum, having observed that the mode in which the seeds of *Orchideæ* germinate was unknown, and Dr. Withering in the third edition of his British Plants having promulgated an idea that their generation was effected in some way not yet understood, both these points are here ascertained beyond all shadow of doubt. We learn from this concise paper, written in Latin, and accompanied with figures of the seeds of *Orchis Morio* and *Limodorum Verecundum* in progressive stages of growth: 1st, that the thick elongated body within the petals is a true style, pervious through its whole length: 2dly, that the stigma is broad and conspicuous in the front of the top of the style: 3rdly, that many genera of this natural order are monandrous, but others diandrous, with sessile antheræ: 4thly, that the true pollen is an elastic waxy substance only differing in size and shape from that of other vegetables; and that when applied to the stigma it never failed to impregnate the seeds, which germinated in the greatest profusion, without any care, upon the pots and moist parts of the hothouse: 5thly, that the author thinks not only the plants of this natural order, but all *monocotyledonous* plants whatever, would be more accurately described as *acotyledonous*, the part they first send upwards having no analogy to the cotyledons of other vegetables. We have only to add that this last opinion was advanced by Linné himself, both in his Philosophia Botanica and Prælectiones.

VIII. *Description of four new British Lichens.* By Dawson Turner, Esq. M.A. F.L.S.

This paper, in our humble opinion, is a model for every cryptogamic writer. The author remarks that some botanists, anxious to create new species, have made no allowance for differences caused by age, situation, or aspect; and he brings very strong proofs in *Lichen muscorum* and *impressus* of Acharius, both of which have been almost universally considered legitimate species. Any one, he tells us, who will be at the trouble of examining the former, may soon be convinced that it is only *parusemus*, which in passing from a wall or moss acquires a less compact crust. The latter he as fully believes, from the suggestions and specimens of Dr. Scott, professor of botany in Dublin, to be only the scutella of *scruposus* occupying the leaves of *pyxidatus*. The four new species are illustrated by coloured figures, and a portion of each magnified.

IX. *Descriptions of some Species of Carex from North America.* By Edward Rudge, Esq. F.L.S.

In this valuable communication the author observes that the few specimens of *Carex* hitherto received from North America, show, in almost every instance, that there is a striking dissimilarity between them and those of European growth; and he is disposed to entertain an opinion that the androgynous species may with propriety be made a distinct genus from those which have male and female spikes. The figures (for we have had occasion to collate them) are most faithful representations of the originals.

X. *Remarks upon the Dillenian Herbarium.* By Dawson Turner, Esq. F.R.S. A.S. and L.S.

Perhaps there never was an instance of so much real knowledge being acquired in one day, as this paper contains: it was however allowed to be a long one and unbroken; and this acute cryptogamist had also the assistance of an equally intelligent observer in that branch of the science, Mr. Joseph Woods. We think they have made the best possible use of the professor's liberality, fulfilling that blessed text in St. Matthew, "*Freely ye have received, freely give*;" and we hope other botanists will imitate them in this respect.

XIII. *An Illustration of the Grass called by Linnæus Cornucopiæ Alopecuroides.* By James Edward Smith, M.D. F.R.S. P.L.S.

The president's communications are always scientific, and written in language peculiarly his own, which here renders literally a tale about a straw very amusing; nor do we recollect a stronger example of the *Utile* being joined with the *Dulci*, in all the Transactions. The pith of this straw in few words is, that *Phalaris utriculata* is an *Alopecurus*, a crumpled variety of which was described by Linnæus, for the species of *Cornucopiæ* above mentioned. By a note in our copy of Jussieu, we find we cultivated this very grass in 1789 from seeds taken out of a specimen gathered by the author near Rome, and that we then referred it to *Alopecurus*.

XIV. *Description of such Species of Chironia as grow wild at the Cape of Good Hope.* By Sir Charles Peter Thunberg, Kt. of the Order of Wasa, F. M. L.S.

In monographias of genera, no one treads more closely in the steps of Linné, than the present successor to his botanical throne. In this learned paper, written in Latin, he tells us that *Gentiana*, *Swertia*, *Exacum*, *Chlora*, and *Chironia*, are so nearly allied, that it is difficult to say if they ought to remain distinct genera. Seven species of *Chironia* are then described, two of which are figured, all from dried specimens. Last summer we had occasion to study the genera of this natural order, upon examining *Parnassia*, which certainly belongs to it, as well as *Menyanthes*. We then thought that the different structures of the corolla, nectaria, and pericarpium, would separate the species which it contains into very easy genera. Numbers, we believe, will turn out of still less consequence than usual, so that we do not hesitate to join *Chlora* with *Exacum*.

XV. *Remarks on the Generic Characters of Mosses, and particularly of the Genus Mnium.* By James Edward Smith, M.D. F.R.S. P. L.S.

This is no paper on which an ill-natured critic can quote "*grano eruditionis reperto stentorius ebuccinat*;" for it is full of profound learning, and the principles upon which all other genera as well as those of Mosses should be constituted, are impartially developed. After some pious general observations, which would not disgrace the pulpit of a bishop, we learn that Dillenius, and eke Linnæus, both so far blundered as to describe the capsulæ of this natural order for antheræ! The former of these great men referring every moss in which he found a powdery star to his genus of *Mnium*, constituted eight supposed species, of which two are *Jungermanniæ*, and another *Blasia pusilla*. The latter also, making every moss in which he found a powdery star of, as he thought, female flowers a *Mnium*, was followed by the herd, till the illustrious Hedwig demonstrated these parts to be male flowers, and essential to every genus in the order. Hence for some years cryptogamists were at perpetual variance about *Bryum* and *Mnium*, Hudson being the only one who steered tolerably clear of error, by referring to the latter such mosses only as have a naked head of male flowers. To Hedwig, therefore, the president eagerly looked up for help in distinguishing these genera; but, alas! such, learned reader, is the lot of humanity, he was more than disappointed; *Mnium* being not only left as unintelligible as before, but even still more confused by reversing its original characters. Therefore, after the golden rule in Philosophia Botanica, "*Genus dabit characterem, non character genus*," our author proceeds to correct the genera of Hedwig. *Didymodon homomallum* he scruples not to refer to *Grimmia*, and the other species to *Trichostomum*. He next abolishes *Cynontodium*, *Webera*, and *Pohlia*, observing that the presence of hermaphrodite flowers in no case affords a natural generic character. The situation of the female flowers is then investigated, and their being lateral or terminal we are told is of primary importance. *Bryum*, *Hypnum*, and *Pterogonium* cannot be defined by any other means; but Hedwig, carrying the same distinction through the male flowers also, separates *Barbula* from *Tortula* against every natural principle. *Fissidens* and *Dicranum*, *Weissia* and *Grimmia*, are (in many instances at least) as improperly torn asunder. *Gymnostomum* is the only instance in which the president would recur to the situation of the male flowers for a character. The habit of *Anictangium* indeed, the original *Hedwigia*, almost authorizes its separation from the other naked-mouthed mosses, and a note from that exquisite cryptogamist Mr. Dawson Turner suggests that the female flowers in several species are lateral. The grand mark of distinction by which the president proposes to establish some of his genera is now brought forward, namely, the capsule being longitudinally furrowed. It is chiefly seen in the ripe fruit, keeping the real *Mnia* of Dillenius together, except his first, *Tetraphis pellucida*, and associating with them the *Arrhenopteris* of Hedwig. Having examined every species of *Bryum*, he finds a smooth capsule essential to that genus. In *Hypnum undulatum*, however, and perhaps *Ornithopodioides*, it is furrowed. Thus a furrowed spherical capsule distinguishes *Bartramia*, and a furrowed cylindrical capsule *Mnium*: if this character be thought too trifling, these mosses must all be made species of *Mnium*; but the author adds, he should with difficulty assent to such an union. We have here to express our amazement that this character of a furrowed capsule is declared of no importance whatever in the mosses with a single fringe, fearing some new discovery may impair its value in those with a double fringe: nor is the anomaly of germen superum and inferum in *Saxifraga* a parallel case to this, that part, as the genus now stands, being never at all brought forward in its character. We confess we know little of mosses yet, but we hope to study them in time; and in every other natural order which we have examined, some one or more predominant characters appear to us invariably to dictate the genera throughout the whole of it, so that he who runs may read them. For example, in *Filices*, the various situation and dehiscence of the involucrum: in *Aroideæ*, the presence of a common or distinct involucrum to each flower: in *Gramineæ* we humbly presume the various structure of the inflorescentia and glumæ: in *Scitamineæ*, the shape of the corolla and genitalia: in *Compositæ*, the structure of the calyx and receptacle: in *Apocineæ*, the shape of the corolla and antheræ: and in very many orders, as *Proteæ, Umbellatæ, Sapotæ, Coniferæ, Malvaceæ,* the fruit alone almost serves for a primary character, being of no less consequence in one genus than another. The paper concludes with the determination of six species of *Mnium*, in the author's usual able manner, the last of which, the *Arrhenopteris* of Hedwig, Mr. Dawson Turner has discovered to be the same with *Hypnum illecebrum* of the Species Plantarum, excluding the synonym of Dillenius.

XVI. *Observations on the Zizania aquatica.* By Aylmer Bourke Lambert, Esq. F.R.S. V.P.L.S.

A fine engraving of this grass, drawn by Ferdinand Bauer, is here given. From the author's account of it we learn that the seeds will not vegetate if kept long out of the water, and that it might be sown with advantage in shallow ponds where no other grain will grow. By the specimen in Linné's Herbarium it appears this plant is his *Zizania palustris* as well as *aquatica*.

XVII. *Observations on the Durion, Durio zibethinus of Linnæus.* By Mr. Charles Konig, F.L.S.

We find that Linné took up this genus from Rumpf, without ever having seen the plant; and that, probably, from a blunder in the Latin translation of that author, Jussieu has classed it with his *Capparides*. There is not the smallest doubt, however, that it belongs to *Malvaceæ*, as fully appears by the figures and dissections annexed, which are both beautiful and very accurate. A copious description of the whole plant follows, with some important observations on the structure of such singular fruits. This we are told is in great request in the Molucca Islands; and when the first repugnance to it is overcome, none is more enticing or delicious, though the rinds emit such offensive effluvia, that in Amboyna it is forbidden by law to throw them out near any public path.

XIX. *Biographical Memoirs of several Norwich Botanists.* By James Edward Smith, M.D. F.RS. P.L.S.

We have already remarked, that in all the communications of the president, the *utile* as well as the *dulce* have been eminently conspicuous: here, however, we think none but British readers of the Linnean Transactions will be gratified, and that even they must be content with the last-mentioned mark of perfection. For this reason, though perhaps no paper ever read before the society gave more general satisfaction, had we balloted at all in the council for its publication, we should have put in a black ball, thinking the dignity both of the society and its founder would have been more consulted, if he had at least printed it in some of the monthly works with which our proud city, still the "*punctum saliens in vitello orbis,*" teems. For those who delight in anecdote, however, we select the following. The great Sir Thomas Browne, who first observed *Salsola fruticosa* in this country, died at Norwich in 1682. Mr. Wilson, a tailor, made frequent journeys to London about the years 1738 and 1740, collecting and drying many plants from the physic-garden at Chelsea. Mr. William Humfrey first discovered, near Norwich, *Lycoperdon phalloides.* Mr. Joseph Fox, a weaver, first raised a *Lycopodium* from seed. Mr. Rose, in the Appendix to his Elements of Botany, transcribed synonyms without seeing the original books. The first plant the president examined botanically was *Ilex europæus,* on the 11th of January 1778, the same day on which Linnæus died. Mr. Pitchford, a most accurate botanist, settled in Norwich in 1769: a few days before his death, in 1803, he was particularly strenuous with the president to separate *Mentha hirsuta* with capitate flowers, from *Mentha sativa* with verticillate flowers. It happens that these two are the only mints we had ever examined when our author's valuable dissertation on this genus appeared in the fifth volume of these Transactions.

Not being accustomed to determine the few English plants we occasionally gather upon slight grounds, we were astonished to find his suspicion of the former being a mere variety of the latter, first promulgated in English Botany, there confirmed; and we immediately hinted to him, that the stem alone, exclusive of their very different habit, afforded an unerring specific character. His own opinion, however, being now, he tells us, as well as in Flora Britannica, unshaken, it falls to our lot reluctantly to give our verdict against it, for the following reasons:—in *Mentha hirsuta*, and all its varieties, the young shoots and leaves in spring are of a dull opake green: two opposite sides of the stem are convex: the capitula are large, with a great many flowers, not to notice that the upper ones hide the leaves: the teeth of the calyx are a little recurved, and evidently acuminated: the corolla is large. In *Mentha sativa*, and all its varieties, the young shoots and leaves in spring are of a deep shining green: two opposite sides of the stem are quite flat: the capitula are small, with few flowers in comparison of the former, and the upper ones, in luxuriant specimens, scarce ever hide the leaves: the teeth of the calyx are erect, or even incurved, and much shorter than those of the former: the corolla is small. It is only bare justice to Mr. Sowerby to add that his figures of these two plants are uncommonly faithful.

XXII. *Extracts from the* Minute Book *of the Linnean Society of London.*

Mr. Lambert here communicates the subsequent useful piece of botanical information; that the *Agrostis linearis* of Willdenow, the famous *Durva* of the Hindoos, figured in the fourth volume of Asiatic Researches, and so celebrated by the late Sir William Jones for the beauty of its flowers and its nutritious quality as pasture for cattle, is nothing but *Panicum dactylon* of our own Cornish shore.

R. A. Salisbury.

XII. *Annales du Muséum d'Histoire Naturelle, par les Professeurs de cet Etablissement.* à Paris. an xi. (1802.) 4to.

THESE annals of natural history are certainly a most valuable collection of papers in every branch of that science: such of our readers, therefore, as cannot have access to the original, will doubtless be well pleased to have some account of the botanical papers contained therein, and we mean to give either a concise abridgment, a more enlarged analysis, or a full translation of the whole, according to the degree of importance that may appear to us to attach to each. The following is therefore to be considered more as an analytical than a critical review.

I. *Description of a new Genus of Plants.* By Desfontaines. Vol. i. p. 49.

TITHONIA.—*Ch. Ess.*—*Cal.* cylindricus, gemino ordine multipartitus, laciniis ovato-oblongis, conniventibus, strictis, subæqualibus. *Flores* radiati, ligulis neutris. *Corollulæ* hermaphroditæ, tubulosæ, supra basin inflatæ, quinquedentatæ. *Semina* elongata, paleis 4 aut 5 coronata. *Recept.* paleaceum. Folia alterna.

TITHONIA *tagetiflora;* foliis alternis, cordatis, triangularibus, in petiolum productis; inferis trilobis.

M. Desfontaines has given the name of Tithonia to this plant from the aurora or saffron coloured flowers, and remarks its affinity to Gaillardia of Fougeron (Galardia *Schreb.* 1323.), or Virgilia of L'Heritier[*], from which it differs chiefly in the calyx being cylindrical, with equal segments, and the florets inflated at the base. The seeds of Tithonia are besides very long, and crowned with four or five paleæ only. The seeds of this very ornamental plant

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[*] In the sexual system this plant must be classed in Syngenesia Polygamia frustranea, and may precede Rudbeckia.—ED.

were sent to Paris in the year 1778, by the traveller Thiery, from the neighbourhood of Vera Cruz: it was cultivated in the Jardin des Plantes for two or three years, but, producing very little seed, has been since lost.

II. *Memoir on the plant called by Botanists Erica Daboecia* [more properly *Dabeoci*], *and the necessity of removing it to another genus and a different order*. By Jussieu. Ib. p. 52.

Linnæus, Adanson, and even Bernard Jussieu, included in the same family the two orders of Rhododendra and Ericæ, as since distinguished by the celebrated author of this memoir in his *Genera Plantarum*, published in 1789. In both these orders the capsule is 4-celled and 4-valved, but the manner in which the valves form the cells is entirely different. In the Rhododendra the margins of the valves are introflected, and attached to the central axis or columella in such a manner that each valve forms a distinct cell, without the assistance of the neighbouring valve (*valvæ introflexæ loculum proprium constituentes*). In the Ericæ, on the other hand, each valve has, in its middle, a septum or partition which divides it into two equal parts (*valvæ medio septiferæ*). This septum is attached to the central axis, and serves as a partition of the cells; so that each valve constitutes the half of two different compartments. This striking distinction in the nature of these capsules, overlooked by the systematic writers, fixes a determinate line between the two orders, and has been adopted by other followers of natural orders. Ventenat has upon this ground moved Epigæa from the Ericæ, where it had been placed by Jussieu, to the Rhododendra. Smith in his Icones Plantarum, t. 56. from the same motive, has established a new genus, referred to the same order, named by him Menziesia, which, to the character of a corolla with a four-cleft margin, eight perigynous stamens, and a detached ovary, terminated by one style and one stigma, joins that of a capsule of 4 valves, introflected, exactly as in Rhododendrum and Epigæa.

On examining the capsule of Erica Dabeoci, Jussieu found the same structure as in the Rhododendra, that is, four introflected valves; from whence he concludes that this plant, far from belonging to either Erica or Andromeda, ought to be removed to the neighbouring order. An examination of its other characters will not, though considerably different in habit, allow of its separation from Menziesia of Smith; and Jussieu proposes to call it MENZIESIA *polifolia*, because its leaves resemble those of Teucrium Polium and Andromeda polifolia L., and gives us the following descriptive rather than distinguishing character:

M. *polifolia*; foliis alternis, ovatis, revolutis, supra viridibus, glabris, passim pilosis, subtus tomentosis, incanis; floribus racemosis, terminalibus.

The species described by Smith he proposes to characterize:

M. *ferruginea;* foliis terminalibus, fasciculatis, lanceolatis, denticulatis, non revolutis, supra pilosis, subtus lævibus; floribus inter folia pariter fasciculatis, singulis longe pedicellatis.

He remarks also that to this genus belongs Azalea pilosa of Michaux.

We have to observe upon this memoir, of which we have given an abridged account, that similar reasons led Mr. Salisbury, in his accurate monograph on Erica, read in the Linnean Society Oct. 6, 1781, to refer this plant to the genus Menziesia. Vide Transactions of the Linnean Society, vol. vi. p. 323. Linnæus, who at first associated this plant with Erica, afterwards, on account of its habit, removed it to Andromeda; but Dr. Smith in his Flora Anglica, on account of the structure of the capsule, so different from that of Andromeda, restored it to Erica. Are we to infer from hence that this able botanist did not consider "*valvæ medio septiferæ*" as essential to the character of Erica,—as otherwise it will no more unite with this genus than with Andromeda?

We cannot refrain from adding, that had our author thought fit to have retained the trivial name before in use, he would in great measure have avoided the confusion necessarily attendant on the change of appellation, as Dabeoci, already bandied from one genus to another, would have been readily recognised under a new generic title.

III. *On scarce Plants which flowered in the Garden or in the Hot-houses of the Museum.* By Desfontaines. p. 177.

We shall only enumerate the names:—Methonica (Gloriosa *L.*) superba; Cheiranthus Farsetia; Polygala oppositifolia; Andropogon annulatum *Vahl.*; Malpighia coccigera; Conyza candida.

IV. *Description of a new Species of Scorzonera.* By the same. p. 133.

Scorzonera *aspera;* foliis asperis, lanceolatis, dentato-pinnatifidis; stylo incurvo; pappo sessili, superne plumoso.

This is accompanied with a copious description and a good figure.

A native of the Levant: is perennial, and preserved through the winter in the green-house: flowers in the summer, and is propagated by seeds.

V. *Description of a new Species of Dianthus.* By the same. p. 198. with a figure.

Dianthus *spinosus*; fruticosus, procumbens; foliis rigidis, subulatis, spinescentibus; floribus capitatis bracteatis.

The Dianthus spinosus has considerable resemblance to D. prolifer *L.*, near to which it should be placed. Its woody stalks, and hard, thick, sharp-pointed leaves, readily distinguish it from every other known species of this genus.

VI. *Scarce Plants which flowered in the Year* x. (1801), *in the Garden or Hot-houses of the Museum*. By the same.

A translation of this paper has already appeared in this work, vol. i. p. 122.

VII. *Letter from M. Ruffo to M. Thouin*. p. 253.

In this very uninteresting paper M. Ruffo recommends the culture of the lemon-scented vervain, Verbena triphylla (*L'Herit.*), Aloisia citriodora (*Ortega*), which, though it dies down to the ground in the winter, will shoot forth again in the spring. M. Ruffo uses it either fresh or dry to give the flavour of lemon to punch, drinks an infusion of it in the place of Chinese tea, and adds it to his ice creams, &c. for flavour. p. 253.

It has been found that this plant, which is figured in the Botanical Magazine, No. 367, will also survive through our winters in England in the open ground.

VIII. *On a new Species of Papaw*. By Desfontaines. With a figure.

CARICA *monoica* (Monoicous Papaw).

CARICA racemis erectis, petiolo brevioribus; foliorum lobis integris et divisis; petiolis canaliculatis; floribus monoicis.

This species of Carica is a native of Peru, has near affinity with Carica Papaya *Linn.*, from which it differs in having leaves less divided, in its channelled petioles swelling at the base, and having the margins continued down the stem; whereas the petioles of the common Papaw are cylindrical, or only a little depressed on the upper surface, and are not dilated at the base. The C. monoica flowers in the first year, from the seed: its racemes are short and straight. The other is dioicous; its panicles of male flowers are drooping, 6 or 8 decimetres long, and it does not flower in our stoves till after several years.

CARICA *prosopuja* Linn., a native of Surinam, imperfectly known, and regarded by some botanists as a variety of *C. Papaya*, has according to Linnæus a simple stem, lobes of the leaves undivided. Besides, the *Papaya ramosa, fructu pyriformi* of Feuillée, which Linnæus regards as a synonym of this, appears to be a distinct species, having, according to Feuillée, rose-coloured flowers, and fruit of the form of a very long pear, whereas the flowers of all the known species of Papaw are pale yellow, and have not a pear-shaped fruit.

The wood of the Papaws is soft and spongy, the fruit pulpy, succulent, aromatic, and agreeably sweet. It is eaten before it is ripe, boiled in water, and, when ripe, both raw like melon and preserved in sugar.

IX. *Rare Plants which flowered in the Garden or Hot-houses of the Museum, in the Year* x. By M. Desfontaines. p. 276.

Centaurea *pumila*. Dwarf Centaurea.

C. squamis apice scariosis; spinis simplicibus; foliis incanis, carnosis, pinnatifidis, dentatis, undulatis; lobis obtusis, caule brevi aut nullo.—Centaurea pumila *Linn. Sp. Pl.* 1300. (Vide Annals of Botany, vol. i. p. 174.)

Brought from Egypt, of which country it is a native, by Delile. The description is accompanied by a figure.

Asclepias *Linaria* Cav. Icon. no. 63. t. 57.

Asclepias *mexicana*; caule erecto, herbaceo; foliis angusto-lanceolatis; inferis quinis aut senis; superis ternis, quandoque binis; capsulis sulcatis.—A. mexicana Cav. Ic. no. 64. t. 58.

The flowers were constantly of a pale violet colour, not white, as described by Cavanilles, and the peduncles were much shorter than in his figure; the leaves too were somewhat dissimilar.

Ehretia *Bourreria* Linn.

X. *On the fruiting of the Jamrosade* (Eugenia Jambos *L.*) *in the Hot-house of the Jardin National des Plantes.* By And. Thouin. p. 357.

As this plant has been rarely known to produce fruit in Europe, M. Thouin has thought it worthy of being recorded, and has remarked the distinguishing characters of the particular variety (Jambosa sylvestris alba *Rumph Amb. t.* 39.), its habitudes in the climate of France, and the probability there may be of naturalizing it.

This tree is about eleven feet high, and measures two feet and a half at the base of its trunk; is branched from about the fourth part of its height to the top, and is of an agreeable pyramidal form. The leaves, of the shape of those of the peach-tree, are at their first appearance of a lively red, and pass through a variety of shades till they arrive at a dark shining green. The flowers, placed at the extremity of the branches, consist of four petals the size of the blossom of the apple-tree; in the middle is a hoop of very numerous stamens, half as long again as the petals; filaments white, tinged with violet towards their extremities, and terminated by yellow anthers: the style in the centre. The stamens, the petals, and the four calycine leaflets, are all placed upon a globular germen. The fruit is at first green, but as it ripens turns white, with a reddish tinge on the side exposed to the sun, is about the size and somewhat the shape of a medlar, is slightly acid, and smells something like a rose; from whence it is called in some of the French colonies the rose-apple. It contains one or more nuts, which naturally separate from the flesh: the nut when solitary is round, a little flattened at each end; but when there are several nuts, as frequently happens, these are angular at the parts where they touch, and rounded at the circumference. The shell is thin, brittle, and easily separated, covering a greenish white kernel, which breaks into several irregular pieces, and contains a cavity in the centre, varying in form, and lined with a thin pellicle easily detached from the substance of the nut, which has a roughish somewhat aromatic taste. This fruit, if it cannot be esteemed as proper nourishment for man, may at least be considered as affording a very agreeable dessert, pleasing at the same time both the taste and smell.

This tree, which was imported from the West Indies in 1765 by the Abbé Gallois, though very young at the time, soon bore flowers in the tan-pit of the stove; but for several years it produced no fruit. Its mode of culture was several times changed with various success; but the treatment which succeeded its producing ripe fruit, was by exposing it at the same time to great heat, with a free supply of air. With this design it was planted at the foot of a white wall in the conservatory, (*la grande serre de naturalisation,*) where the reflected rays of the sun, to which it was exposed the greatest part of the day, increased the heat; it was at the same time so situated as to receive the perpendicular light, and was surrounded by a volume of air which was renewed the more rapidly in proportion to the increase of the heat: care was also taken to supply it with frequent waterings, in proportion to the great evaporation occasioned by the heat and current of air. The good effects of this management were soon seen; the tree bore plenty of flowers, succeeded by fruit, the greatest part of which arrived at perfect maturity.

The kernel of the nuts was found very soon to lose all power of vegetation, by becoming horny; which accounted for the fact, that the seeds imported from abroad never germinate except brought home in layers of earth. To assist the germination of these seeds, M. Thouin had recourse to a method which he had often found very successful; which was, to put the nuts, as soon as taken from the fruit, in the breeches pocket, and keep them there two or three days: the moist and gazeous heat of the animal perspiration commonly perfects such seeds as may not have acquired their full maturity, and disposes them to germinate more readily; perhaps too the acid carbonic gas of the perspiration unites with the embryo. This sort of bath is preferable to that of water often used to the seeds from hot countries, which is apt to hurry on putrefaction.

M. Thouin remarks that this tree, being one of those which bears no gemmæ, cannot probably, for a very long time, be naturalized to the climate of Northern France, though he does not despair of its growing in the most southern parts, as in the departments of the Var, of the Maritime Alps, or in the Island of Corsica.

XI. *Description of* NYMPHÆA *cærulea.* By Julius Cæsar Savigny. p. 366.

XII. *Observations on the* LOTUS *of Egypt.* By Alire Rafeneau Delile. p. 372.

These two memoirs give an accurate and satisfactory history of the Nymphæa Lotus, and N. cærulea of Linnæus, and in some measure of the Nelumbium also. These papers having both appeared already in an English dress, we need not be very particular in our analysis. The first memoir, by M. Savigny, is chiefly designed to establish the real specific difference between Nymphæa Lotus and cærulea. The two plants are carefully compared together, and contrasted in all their parts, and the points of agreement and difference accurately stated. The author has then selected the most prominent marks of distinction, by which he characterizes the two species as follows:

NYMPHÆA *Lotus;* foliis dentatis, antheris apice simplicibus.

NYMPHÆA *cærulea;* foliis repandis antheris apice subulato-petaloideis.

The memoir by M. Delile completes the history of these plants, both still very common in Lower Egypt, though not occurring at all in the Said, which the author supposes may be owing to the different circumstances of these countries. In Lower Egypt the waters of the Nile, spreading over a vast extent of land, do not rise to so great a height but that the plants, growing in the lakes and in the canals of the Delta, may easily reach the surface uninjured by the current, which, in the Said, where the Nile rises to a more considerable height, is very rapid. Neither the roots nor the seeds of these plants appear to be at present in much request by the inhabitants for food, neither are they altogether neglected. The author saw the former exposed to sale in the market of Damietta, and upon tasting found them not unpalatable.

The principal design of this memoir is to point out the plants which the antients meant by the Lotus of Egypt, so famed in their writings, and the author has succeeded in setting this in a very clear light. The subject has indeed of late years been pretty well understood; but those who still feel any doubts may in general have them resolved by resorting to this very complete and satisfactory account. The kinds of Lotus chiefly mentioned by the antients are shown to be the Nymphæa Lotus, and N. Nelumbo, of Linnæus, both of which are circumstantially and intelligibly described by Theophrastus, when his descriptions are rightly applied; but the latter plant being entirely unknown in Egypt, travellers, by endeavouring to apply what he has said of both kinds to what is now found there, have introduced a great deal of confusion.

It is remarkable that the antient writers make no mention of the blue Lotus, though now fully as common as the white, both species growing every where intermingled. It might be concluded from hence that the N. cærulea was a stranger, introduced from the East Indies with the rice, especially as it is found growing in abundance in all the rice grounds of the Delta: but the difficulty is not to be thus solved; for M. Delile informs us, that in the paintings in the grottos of the Said, undoubtedly antient, the blue Lotus occurs fully as frequent or more so than the white.

It is probable that the Nelumbium, which was formerly so common, but has now totally disappeared from Egypt, was never indigenous there, but owed its preservation to culture. Theophrastus indeed says, that it was both cultivated and grew spontaneously; and no doubt the frequent cultivation, in a country suited to its nature, might render its spontaneous growth not uncommon, though not naturally a native of the country.

Had the Nelumbium been still found in Egypt, M. Delile, who probably never saw the plant living, would not have fallen into the mistake he has made in a note on a passage in Strabo, where he accuses the translators of having misunderstood the original, in describing the leaves as standing high out of the water; whereas, he says, they float upon its surface. Now the truth is, that although, when the plant is very young, the leaves do float upon the surface of the water, yet, in its flowering season, these, as well as the flower, are elevated far above it upon strong rough footstalks, as described by Theophrastus.

It is remarkable that both Nymphæa *Lotus* and *cærulea* occur in very distant parts of the globe; but a question will arise whether the plants of these different countries are really the same species or different,—an inquiry which neither of these authors has touched upon. The first of these plants is found in Egypt, in Hungary *, and in several parts of the East Indies; the latter in Egypt, at the Cape of Good Hope, and in the East Indies. The blue Nymphæa from the Cape is now frequently to be met with in the stoves and conservatories of the curious, where it blows freely. Has been figured in the Botanical Magazine,

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* Vide Plant. Rar. Hung. Bot. Magaz. No. 197.

No. 532; in the Botanist's Repository, No. 197; and in the Jardin de Malmaison, a figure of that found in Egypt accompanies the memoir of Savigny now under review, from which it appears that, though very like, these plants differ in some respects. The purple lines and dots in the calyx are wanting in that from the Cape; and if the accuracy of the draftsman may be depended upon, a more material difference occurs in the form of the *stigma*, which is flatter and less cupped in the Egyptian than in the Cape plant: similar or perhaps greater differences may be found in the white-flowered Lotus of different countries, which, if the nature of the tubers is the same in all, might without great difficulty be brought to the test of examination, as they might most probably be easily preserved for a very long time in dry sand. Those brought from Egypt by M. Delile, although kept out of the ground more than two years, upon being planted in a pot and immersed in water, immediately vegetated and produced several flowers, smaller indeed, paler, and less fragrant than in Egypt.

XIII. *Extract of a Memoir of* Cit. Decandolle, *on the Genus Strophanthus.* p. 408.

This extract contains some preliminary observations on the numerous family of *Apocineæ*, in which the author concludes that the whole order, notwithstanding the diversity of characters which botanists have made use of to divide it into several sections, has nevertheless certain appropriate characters which distinguish it from all the analogous orders: such as a calyx divided into five segments; a monopetalous, five-cleft corolla; five stamens, adhering to the corolla and alternating with its laciniæ; a superior ovary, with one or two stiles, terminated by one stigma; an embryo enveloped in a thin fleshy perisperm. The leaves are opposite, very rarely alternate, and from the axilla of each leaf issue two rows of ciliæ, which often surround the stem, and form by their re-union a ciliated membrane, giving to those that have this character the appearance of belonging to the *Rubiaceæ*; but a little attention will show that this membrane arises from the axil of the leaf, and not from the space between the leaves as in the Rubiaceæ.

The genus described by Decandolle belongs to that section of the Apocineæ, the plants composing which have a bicapsular fruit, and should be placed between Nerium and Echites: it is distinguished from both by the laciniæ of the corolla being very much elongated, and twisted like a corkscrew. It is from this character that it has received the name of STROPHANTHUS (Twisted Flower). It differs also from Echites in having the faux of the corolla furnished with a crown, and from Nerium in having the elongations of the crown greater, and ten in number, whereas in Nerium there are only five.

Strophanthus has woody sarmentous stalks; leaves entirely opposite; flowers on short peduncles, mostly growing together in fascicles, the buds of the flowers bellied, terminated by an extended elongation, consisting of five threads, separating from the base upwards. This genus contains four species.

1. STROPHANTHUS *sarmentosus*.

S. glaber, sarmentosus; floribus glomeratis terminalibus et lateralibus, simul cum foliis nascentibus; corollis subcampanulatis; antheris in filum productis.

2. STROPHANTHUS *laurifolius*.

S. glaber; foliis interdum ternis; floribus glomeratis, terminalibus, post folia nascentibus; antheris in filum productis.

3. STROPHANTHUS *dichotomus*.

S. glaber; ramis dichotomis; foliis mucronato-acuminatis; corollis infundibuliformibus; antheris in filum productis. Echites *caudata*. *Burm. Ind.* p. 68. t. 26. *Lin. Mant.* 52.

4. STROPHANTHUS *hispidus*.

S. hispidus; corollis infundibuliformibus; laciniis longissimis; antheris acutis, muticis.

All these species, except the third, which is from the East Indies, are natives of Sierra Leone, from whence they were brought to Europe by Mr. Smeathman.

The fruit has not been observed by the author in any one of the species; but the two ovaries, and the affinity of these plants to Nerium and Echites, lead to the belief that it consists of two capsules containing feathered seeds.

XIII. Martini Vahlii, *Prof. Bot. Havn. &c.—Enumeratio Plantarum, vel ab aliis vel ab ipso observatarum, cum earum differentiis specificis, synonymis selectis & descriptionibus succinctis.* Volumen 1. Havniæ, 1804. 8vo. pp. 382.

If it should not, at present, be thought absolutely to exceed the powers of an individual, to give a complete, correct, and well arranged catalogue of all the known vegetables, yet, it requires no great penetration to perceive, that before the end of the present century, no botanist, however favoured by circumstances, will be bold enough to undertake so impracticable a task. Even in our days, when, at a moderate calculation, the number of the known species of plants exceeds by about three times that which Linnæus once estimated to be the sum total of all the vegetables spread over the surface of the globe, and when new sources, in regions peculiar in their vegetation, and untrod before by the foot of scientific botany, are daily opening, to overflow our gardens and herbaria with their riches, the attempt to acquire a competent knowledge of all of them, and, single-handed, to arrange and furnish with proper distinctive characters such a prodigious number of objects, is an undertaking for which very few botanists can be qualified; for, not only is the combination of a peculiar talent and indefatigable study necessary, but also the accidental though important advantage of extensive libraries and collections, which often cannot be consulted without considerable difficulty. We mean not the slightest disparagement to the great merit of Willdenow's Species Plantarum, a work which has added much to the celebrity of its author, nor to compliment a man whom death, unfortunately, has placed * beyond either our praise or censure, when we pronounce, that, in our opinion, the late Professor Vahl was among the very few botanists authorized by their botanical acquirements to embark in a work of the nature of this, of which the first volume is now to pass under our review. The materials which this excellent man had prepared for it are the result of twenty-six laborious years, in which he diligently recorded all the discoveries respecting the species of plants, stocked his herbarium with a vast number of new and scarce plants, and availed himself of every opportunity that offered of studying the richest collections of Europe. Whilst every votary of the science laments the fate that cut the thread of his life before the completion of the work, he will feel some consolation to learn that the Danish government has taken measures to secure, as far as possible, the advantages to be derived from the materials which the professor had prepared for the remaining volumes.

The system adopted for arranging all the plants is, with the exclusion of two classes, that of the author's immortal master in the science; and indeed, until the natural arrangement shall have been brought to that perfection and harmony of which it is susceptible, surely no author can think of adopting any other than the Linnæan system, as the basis of the

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* See the miscellaneous articles of this number.

Species Plantarum: nay, when that period shall arrive, this system will still be necessary as an easy guide and useful index to the great work which is to exhibit, in the order of their affinities, the whole range of natural families. Even the admixture of artificial and natural arrangement, although urged by some as a capital defect in the sexual system, is, in our opinion, one of its most interesting features, which, with proper precaution, should be carefully preserved. Linnæus, well aware that a knowledge of the natural affinities of plants was the ultimate end of the science, and foreseeing that success would in the end crown the labours of the philosophical botanist, avoided giving his system a form which must carry along with it the destruction of a great number of his natural genera; for, had it been founded, for instance, upon number only, as injudiciously suggested by some, many genera would have arisen, which, resting on characters of no value in the natural system, could not in future have been acknowledged as genuine.

The alterations which the late Prof. Vahl has ventured to make with regard to that system are few, but judicious. He has given up the classes Dodecandria and Polygamia: the former of these, as being of all those founded on the number of stamina the most perplexing and most subject to variation, he has incorporated with Polyandria; the latter with the respective classes used for its subdividing orders. Linnæus himself proposed to cancel the twenty-third class of his system, on account of the disproportionate number of plants it devours; not to mention the many difficulties that attend finding out the plants belonging to it. Icosandria and Polyandria, united by some preceding innovators, are of course kept distinct by a botanist like Vahl. For the preservation of Monœcia and Diœcia, he makes the following apology:

" Fateor Monoicas æque ac Dioicas a consueto more aliquando recedere; sic Salicem vidi, plurimis ab hinc annis, ramo unico amentis fœmineis, masculis et hermaphroditis onusto, reliquis vero tantum fœmineis; insequente vero anno tota arbor non nisi amenta fœminea protulit. Rarissimæ certe sunt tales aberrationes, et valde dubito, num inde inducere liceat has classes fundamento minus stabili esse ædificatas, quam quæ staminum numero nituntur. Ut prætercam plura, cum hujus loci non sunt, addere tantum placet, quod non absque molestia magna et non nisi per multas ambages genus plantæ dioicæ sit inveniendum, si modo fœmina ad manus est, in methodo, qua secundum numerum staminum per varias classes disperguntur."

That the number of species contained in the volume before us, should far exceed that which Willdenow could enumerate in the two first classes of his *Species Plantarum*, is natural; nor is it improbable that a second edition of the latter work would, in a similar manner, go beyond that of Vahl, in this respect; but, independently of the advantage of being the latest, and of the opportunity thus possessed of turning the labours of those that preceded him to his own use, it must be allowed that few botanists would have been able to amass such a great number of undescribed species as we here find, and which is said to be still more considerable in several of the unpublished classes, particularly in that of Syngenesia. Among the richest fields of new plants, in which he has gleaned the contents of this first volume, are the Flora Peruviana et Chilensis, and the fourth and fifth volumes of Cavanilles's Icones; these have furnished many new species of Salvia, Justicia, Calceolaria, Acæna, and Piper. With such superabundant materials, however, we should have deemed it unnecessary to ransack works that, either on account of the shortness of the specific character, or the insufficiency of the descriptions they give, cannot, on any account, be considered as good authorities; of these we mention, particularly, Walter's Flora Caroliniana, and

Loureiro's Flora Cochinchinensis, both of which have been prudently excluded by Willdenow.

In giving the generic characters, our author has chiefly followed Linnæus, Jussieu, and Gærtner, but not without many very pertinent modifications and alterations, where the increased number of species had rendered these necessary.

But the most striking feature of the work is the small number of synonyms and references, a step indeed necessary in the present state of the science, when the study of the species, having its full measure of difficulties, should not be still more perplexed by a host of superfluous synonyms, which can now only be tolerated when employed as ballast for the trimming of a monograph. But we cannot do better than quote the author's own words: "Omnia synonyma omisi quæ non sunt nisi repetitiones nominis Linnæani, absque ulla addita descriptione, observatione, vel icone, cum nihil conferant ad illustrandam plantam. Inter numerosissimos scriptores rei herbariæ illos tantum elegi, qui vel descriptiones optimas dederunt, vel icones idoneas; plura enim synonyma sæpe plus nocent quam prosunt, præsertim cum haud raro dubia sunt. Sic plantæ a Linnæi diversæ sæpe sub nomine Linnæano venduntur; sunt enim qui minus attendunt ad differentiam specificam et descriptionem quam ad synonymiam, quamvis haud raro falsam. Et mos erat Linnæo interdum citare figuram, non quia plane convictus erat, eam esse plantæ quam nominaverat, sed potius ut ideam ejus daret. Præstat ergo nullum addere synonymum, quam dubium: robur enim artis, ex effatu ipsius Linnæi, non in multis synonymis consistit, sed in genuinis differentiis specificis." The room saved by thus curtailing the synonymy, is more advantageously occupied by a description to each species, more or less detailed, according as circumstances required.

Having premised thus much respecting the plan of the whole work, we shall now proceed to give such remarks on the volume before us, as were suggested by a cursory examination of its contents:

The class MONANDRIA has sustained the loss of at least eighteen genera, destined to recruit another class, which has of late experienced great reduction: all the Scitamineæ are removed to Gynandria. If there be any justification of such a removal, it is, we suspect, to be looked for in the author's excusable wish to defer to a distant period, the description of this difficult and unsettled tribe, for the sake of an opportunity of studying it at leisure, rather than in the propriety of the change. It is true, indeed, that in many of the Scitamineæ, the part bearing the anther, which generally partakes very little of the common structure and shape of a filament, is more or less connate at its base with the style; the stigma too is often so connected between the anthers or lobes of the anther, that neither of those organs can alter their respective situations: but this does not constitute what Linnæus meant by the term *gynandrous*; for, if it did, not only an immense number of other plants in which such coalition takes place, but also all the syngenesious plants in which the upper part of the style is in close and immoveable connection with the anthers, might be considered as belonging to Gynandria.

Boerhaavia is referred to the second class, as most of its species are diandrous; so also is *Mniarum*, in which the number of the stamens is generally two: the calyx of this genus is here likewise described as *superus*, though it is certainly *inferus*, as we have observed in another place. The genus *Callitriche*, being left out in this place, is probably intended to be given in Monœcia; the same is the case with *Tamburissa*, of Sonnerat, who has undoubtedly committed an error in ascribing hermaphrodite flowers to this plant. To us it appears that what he took for styles are merely short hair standing among the anthers. *Lacistema*, placed before in Digynia, is referred to Trigynia, and considered as the same with Nematospermum, though Reichard and Swartz doubted if they were even congeners. *Cinna* is cancelled, as belonging to Agrostis.

Of monandrous genera that are not in Willdenow's Species Plantarum, we have two, viz. *Hopea*, (which should be written *Hoppea*) established by the just mentioned author in the Transactions of the Berlin Society for Natural History; and *Salmonea*, a genus of Loureiro, but full as questionable as the great botanical attainments of the wise Hebrew king, in honour of whom this plant is named. To Monandria are transferred, from Polygamia, *Mangifera*, as having constantly but one fertile stamen, and from Gynandria (though perhaps not properly belonging to either class) *Zostera*, which here contains four species, *marina* (probably the only real one), and Forskähl's *uninervis*, *ciliata*, and *stipulacea*, the two last of which are certainly not congeners of it, as we have observed upon another occasion.—With regard to *Cucullaria excelsa*, we must again come forward in vindication of poor Aublet, for the plant here described under that name is totally different from *Vochy guianensis* of that author, though Reichard and Vahl consider it as the same. To account for the dissimilarity which the latter botanist found between his plant and the figure in the *Plantes de la Guiane*, we are told, "figuræ in opere Aubletii non raro haud bene cum planta consentiunt;" a remark which we cannot but consider as in general ill founded, at least not more applicable in this instance than it was to *Apalotoa* of the same author, which we have proved to be totally different from *Pterocarpus Rohrii*, though pronounced to be one and the same plant both by Rohr and Vahl, who ascribed also, in that case, the little resemblance their plant had with Aublet's figure, to the incorrectness of the latter. Why should we treat illiberally the only man who has given us a tolerable idea of the plants of a country before his time very little known to botanists? For although his work cannot rank with the first rate productions of the kind, still it is not without a considerable share of merit, which ought only to be tried by comparing its figures and descriptions with the real originals, and not with such as are only supposed to be so. This comparison has taught us that the figure alluded to is not incorrect, and that Cucullaria excelsa of Vahl and Vochy guianensis of Aublet (Cucull. excelsa Willd.) are two distinct species.

The generic character of *Usteria* is given from Willdenow, which we have shown not to be quite correct.—The flower of *Qualea* is here, we cannot say how justly, considered as of one petal, and the calyx as pentaphyllous, the spurred part (the second petal of Aublet) being described as a fifth leaflet of the calyx.—*Philydrum* (not Phylidrum, as we find it spelt both here and in Willdenow's work) is not only met with in China and Cochinchina, but likewise in New Holland, from whence this curious plant has found its way into our gardens, and a good figure of it has been published in the Botanical Magazine, No. 783. Vahl's description is entirely taken from Loureiro; but this author describes four petals, whereas there are only two: the lower one furnished at each side towards the base with two smaller lanceolate acute appendages, that have the appearance of petals, but are never separate. Between these appendages, and connected with them at the base, is the stamen, which Loureiro calls *utrinque alatum*, alluding perhaps to the appendages which, in the unexpanded state of the flower, appeared to him as separate petals. The description of the anthers is correct, but is made from these organs before they were arrived at maturity, at which period they become two-lobed. The style is not filiform (nor can it be at once *crassus* and *filiformis* as here described), but thick, increasing upwards, and inclined towards the stamen.

The second class, DIANDRIA, is enriched with about twelve new genera, besides *Gunnera,* transposed hither from Gynandria; *Fraxinus* (containing no less than fifteen, mostly North American, species), from Polygamia; and *Boerhaavia,* from Monandria; while *Globba, Crypsis,* and *Ghinia,* are preserved for other classes. How *Schrebera* of Roxburgh came to be omitted, we do not know; for it appears from the list of books prefixed to the work, that the author was already in possession of the second number of Vol. II. of the Coromandel Plants.—*Jasminum* has four new species, one of which, however, is taken up from Loureiro, and a second from Burmann's Fl. Indica only. *J. angustifolium* and *vimineum* are united. *J. elongatum* is described as having *calyx parvus, dentibus minutis*; which shows that Vahl had not Bergius's plant before him, in which the teeth of the calyx are filiform, and more than two lines in length.—*Forsythia* is Syringa suspensa of Thunberg, made into a new genus, the propriety of doing which was already suggested by Willdenow. Walter's Forsythia is a Decumaria.—To *Linociera* are referred *Chionanthus domingensis* Lam., *Ch. cotinifolia* Willd., *Ch. zeylanica* L., and *Thuinia flavicans* of Willemet, on account of their sessile anthers.—*Striga* is an obscure genus of Loureiro with one species.—*Micranthum,* a new genus taken from Michaux's Flora Americæ borealis; one species. —*Veronica:* the number of the species here enumerated is 75: the additions from Schrader's dissertation on the spiked Veronicas, are given in the addenda affixed to the volume.—*Wulfenia:* to this genus are added both Pæderota Buonarota and Pæderota Ageria, according to the advice of Jussieu and Smith; the latter genus is therefore dropped.

Rottlera, a new genus of Vahl, placed between Wulfenia and Gratiola, and characterized thus:—*Cal.* coloratus; *Cor.* incurvata, fauce inflata, 5-fida, subæqualis; *Stam.* 4, 2 sterilia; *Stigma* simplex; *Caps.* bivalvis, polysperma. The plant that constitutes this genus was sent by Mr. Rottler from Madurei (Madura?) in the East Indies, under the name of Gratiola montana. Vahl rejects Willdenow's Rottlera, as being a species of Trewia; and indeed there is no other difference than that the latter is polygamous, while the former is diœcious.—Of *Gratiola* we find here 31 species, the greatest part natives of the East Indies. *G. trifida* W. is the same plant with Hottonia indica, but it is not probable that Rheede's Tsjera-manga-nari should be a variety of it. *G. Monniera* is left out, probably to be inserted in Didynamia or Tetrandria.

Caranga, a new genus, the Serratula amara of Rumpf, comes in between Gratiola and Galipea; its character, taken from Jussieu's manuscripts, runs thus: *Cal.* 2-valvis, valvula altera minore; *Cor.* calyce brevior, lobo inferiore latiore; *Caps.* calyce tecta, 2-valvis, 2-locularis, polysperma.—Another genus that appears quite new is *Chætochilus*, inserted between Sciuris and Schwenckia, and thus characterized:—*Cal.* subbilabiatus, 5-fidus; *Cor.* tubulosa, limbo 5-partito, laciniis linearibus, duabus superioribus brevioribus; *Caps.* ore 4-dentato, 2-locularis, polysperma. It consists of one species, a native of the Brazils.—The species of *Sarmienta* and *Sanchezia* are all from the Flora Peruviana et Chilensis.—*Elytraria* of the Flora Boreali-Americana is taken up as a genus sufficiently distinct from Justicia. Michaux has however given to his E. virgata the synonym of Justicia acaulis *L.*, which is here properly made a separate species, called *E. crenata*. Also *Just. acaulis*, var. *lyrata*, is raised to the rank of a species of this genus as *E. lyrata*, but the author has forgotten to refer to his own Symbolæ Botanicæ. To these are added *E. tridentata* and *marginata*, the one from the Brazils and

St. Martha, the other from Guinea. Another North American species we have met with in the Banksian Herbarium.

Justicia, with the exception of the just mentioned Elytraria, is preserved in its integral state, containing not less than 147 species, to which might be added several more. But although the separation of the Diantheras from the other Justicias, upon the ground of the construction of the anthers, will not hold good (the approximation of the anthers, or rather of the loculaments of the same anther, passing through different degrees to real union), yet there is a set of species (Dr. Solander's Diantheræ) which constitute a genus founded upon a more solid base, the difference in the fruit, which is a bivalved capsule, in its unripe state pretty much like to that of the real Justicias, but each valve displaying when mature a dissepiment separating at the base and the sides, while it remains fastened at the top, and forms an elastic arc, bearing the seed on a hook similar to that on the fixed receptacle of the real Justicias. This character, in so large a genus as Justicia, cannot appear too trifling for constituting a genus, especially as it connects species that are allied in habit, such as Justicia chinensis L., martinicensis Jacq., frondosa Vahl, pubescens Vahl (Dianth. cærulea Forst.), cuspidata (D. verticillata Forst.). This genus might be called *Diapedium*.—*Just. tetragona* Vahl, and *pulcherrima* Jacq., according to original specimens in the Banksian Herbarium, can scarcely be considered as sufficiently distinct for forming two species; they agree in almost every respect, even in the glandulous specks always found on both sides of the bracteæ, though not mentioned by either Vahl or Jacquin. *J. peruviana* Cav. is given as synonym to *J. furcata* Jacq., the true peruviana of Lamarck being Dianthera mucronata of Ruiz and Pavon. *J. parviflora* Retz. is justly considered as the same with *J. pectinata* L., and the parviflora of Ortega is given in its stead. *J. gangetica* appears to be, and *J. infundibuliformis* certainly is, a Ruellia; with regard to the latter it may be observed, that the East Indian plant, which we have seen alive, differs from the Arabic and Batavian ones in having orange-coloured flowers, and the bracteæ much less hairy; and as in those countries it appears to be cultivated in the gardens, we are as yet unacquainted with its real habitat. Among the *species obscuræ* of Justicia we find the Brazil Diantheræ of Vandelli, and Loureiro's *Zizophora siliquosa*, which, especially the latter, are indeed obscure!—*Schizanthus*, a genus of the Flora Peruviana, with a single species. The important description of its fruit, added in the introduction to the third volume of that work, should not have been omitted; it is this, "Valvulæ capsularum concavæ, bifidæ, intus nudæ, receptaculum centrale utrinque seminiferum, dissepimenti paralleli vices supplens."—*Calceolaria* comprises 54 species, while Willdenow has only eight; but it ought to be considered that all the additional species, except one, are from the Flora Peruviana and the fifth volume of Cavanilles' Icones, both posterior to Willdenow's work. Lamarck's var. β of *C. nana* is here left out, and indeed it is likely enough to belong to C. Fothergilli.—Gærtner, we believe, was the first who separated from Verbena three species, under the name of *Blæria*, differing chiefly in having two bony naked seeds and a calyx bivalved when arrived at maturity; a character afterwards partly adopted by Lamarck for his Zapania, which genus might be taken up, but that it comprehends species differing in the number of stamens as well as in habit. Prof. Vahl has made a similar attempt to divide the Verbenæ, giving here, under the generic name of *Stachytarpheta*, those species that have only two fertile stamina, a four-toothed calyx, a salver-shaped irregularly five-cleft corolla, and two seeds. The species which this genus comprises are those contained in the second of the four divisions of the species of Verbena, as proposed by Ventenat in the sixth number of the Jardin de la Malmaison, with the addition of several new ones.—*Hoslundia*, a new genus from Guinea, with two species, having the habit of Cornutia, is thus characterized: *Cal.* tubulosus, 5-dentatus; *Cor.* ringens, labio superiore concavo; *Stam.* 4, 2 fertilia; *Sem.* 4, intra calycem baccatum. "Hoslundiam," we are told, "in memoriam Olai Hoslundii Smith dixit Petrus Thonning, qui una cum illo Guineam historiæ naturalis causa petiit, at fato infausto morbo correptus (*quis?*) in excursione versus Aquapim præmatura morte periit juvenis, botanices ardentissimus cultor et longiori vita dignus."—*Salvia*, considerably augmented, especially from Flora Peruviana and Cavanilles, has no less than 137 species. At *S. incarnata* Etling. we find Russell's S. bracteata quoted with a sign of doubt; and indeed it is difficult to determine whether it belong to it or not; but to the latter plant seems to belong the synonym which Smith gives to his S. rosæfolia with a query. Willdenow's *S. vulnerariæfolia*, his *S. Habliziana*, and Lamarck's *scabiosæfolia* are considered as the same plant, for which the last-mentioned name is retained. *S. polystachya* Cav. is properly separated from *tiliæfolia* Vahl. The species called *S. formosa* by l'Heritier, is here given as *S. Leonuroides*, so named by Dr. Gloxin, who has given an excellent description of it: as, however, l'Heritier's and Gloxin's publication appeared at the same time, the name of *formosa*, already adopted by Willdenow, might have been retained.—The old genera *Acæna* and *Ancistrum* are combined into one, the name of the former being preserved, with the following generic character: *Cal.* 1-phyllus, aristis glochidatis armatus; *Cor.* 4-petala, apici calycis inserta; *Stam.* 2-4-5; *Stigma* penicillatum; *Sem.* 1 calyce corticatum.—*Columella*, a genus of the Flora Peruviana, with two species, placed between Lithophila and Circæa.—*Codarium*, a genus of the late Dr. Solander, is the Dialium guineense of Willdenow, a plant which has indeed very little to do with the genus Dialium. Mr. Thonning's description of *C. nitidum*, which is here added, agrees with that given by the founder of the genus, except that what the former calls petal, is the nectarium of the latter: on the other hand, what is described as nectarium by Mr. Thonning, appears to be nothing but the tubular bottom of the calyx. We learn here that the legumen, which we have always observed to be monospermous, contains sometimes two or three seeds. It seems, indeed, as if most of the monospermous pods are so through abortion only. The character of Codarium is thus given: *Cal.* 5-phyllus; *Cor.* petalum 1 lineari-lanceolatum, annulo nectarii insertum; *Legumen* pedicellatum, farina farctum subtrispermum evalve.—*Dialium*, a genus which, it seems, is far from being as yet well understood, is preserved in *D. indum* L., and the Arouna guianensis Aubl. added as *D. divaricatum*.—*Eranthemum* has two species here; *salsoloides* L. and *spinosum* of Loureiro; but the former requires re-examination, and the latter does not belong to the genus. *E. angustifolium, parvifolium*, and *E. capense*, are left out, the last of them probably to be given as a species of Ruellia, though perhaps it would have been more properly added to Justicia.

In the second order of the class Diandria, besides *Anthoxanthum* (from which are excluded A. indicum and giganteum Walt., the one being the same with Perotis latifolia, the other a species of Andropogon) we have *Mniarum* from Monandria, and *Gunnera* from Gynandria, with two additional species, viz. *G. scabra* of the Flora Peruviana (G. chilensis Lam.), and *G. plicata* (G. magellanica Lam.), or the Misandra of Jussieu.

The third order of this class still contains only the genus *Piper*; its species, however, are much more than double the number of those of Willdenow. Of these the Flora

Peruviana et Chilensis has been the chief source, all the Piperomias of that work being taken up as species of Piper, of which 136 are here enumerated.

Some observations might perhaps be added on the propriety of this union of the two genera of Piper and Piperomia, as well as on the species; but this review has already exceeded the limits originally assigned to it. Our readers will readily perceive that, in making these desultory observations, nothing like a complete critique was intended, had such been within the sphere of our attainment. Our remarks, we trust, cannot be deemed arrogant; for although we have sometimes ventured to point out mistakes, no one can better appreciate the talents and industry of the author. In such a work, where the observations of others must of necessity be trusted to, neither abilities nor application can always extricate the searcher after truth from the mazes of error. It is by the united efforts of many observers that an enumeration of the species of plants can alone be gradually advanced towards perfection; we have brought our mite, and trust that abler critics will not withhold their more important observations.

We have now only to add, that the exterior form of this volume corresponds with its intrinsic merit; both type and paper are good, and the eye is relieved, as well as the search after the species facilitated, by the specific names being separately placed in the margin. We think, however, that the general habit of the genus might have been more advantageously subjoined to the generic character, as by being postponed to the end it appears at first aspect exclusively to belong to the last species.

C. K.

MISCELLANEOUS ARTICLES.

LETTER FROM DR. SMITH TO MR. KONIG ON THE PRESERVATION OF HERBARIA FROM INSECTS.

DEAR SIR, Norwich, March 24, 1805.

It must be a matter of great regret to all who make collections of dried plants to find how very liable such collections are to become the prey of insects. The maggots of *Ptinus Fur*, and of some others of the smaller *Coleoptera*, as well as some species of *Termes*, are always insinuating themselves, and "seeking what they may devour," even among those herbariums which are most frequently turned over, if kept in a warm or dry place. All the acrid and bitter plants, the genera of *Euphorbia*, *Gentiana*, *Salix*, *Ribes*, *Prunus*, the classes *Syngenesia* and *Tetradynamia*, are peculiarly obnoxious to their attacks.

To guard against this mischief I have long in vain tried oil of Cajeput, oil of camphor from Sumatra, oil of lavender, scraps of Russia leather, &c. At length I was advised to use a solution of corrosive sublimate of mercury in spirits of wine. With this in the course of one winter I washed my whole collection, and have seen no vestiges of any insect since. The best proportion is about two drachms to a pint, to which may be added a little camphor. At first I added several drops of oil of lavender; but that sometimes occasioned a blackness in the solution, though I cannot find it has stained either the plants or paper. The liquor is best applied with a camel-hair pencil, as lightly as possible. The receptacles of compound flowers, and all the more fleshy parts of plants, should be saturated with it. The colours of most plants are greatly revived by this application,

tion, nor can I find that any are injured by it. If the quantity of sublimate be too much, it crystallizes in the form of a white powder on the plant, which looks ill, but is not hurtful. Very resinous plants should be lightly touched, and quickly dried in the air, else the spirit may dissolve their resin, and make it stain the paper.

The most unpleasant effect of this practice is, that the spirit extracts a colour, chiefly yellow, from many plants, which stains the paper on which they are glued. This might be avoided by applying the poison before they are fixed to the paper, which might, with care, be done so as not to injure the specimens in general. They should be, in that case, laid between papers and pressed till dry.

This poison must not be applied to any specimen while any portion of life or moisture remains, as it acts violently on the vital principle of vegetables as well as animals, destroying every thing it touches; but I cannot find any bad effects from it on dead substances. I have insects that were twenty-five years ago impregnated with a much stronger solution of corrosive sublimate than the above, and that are now in the most perfect preservation, except the inconvenience of the downy parts of the *Lepidoptera* being laid flat, which is a great objection to the application of any liquor to them. It preserves birds perfectly, as well as fungi, fruits, and any thing most liable to be eaten by vermin.

My reason for troubling you with this detail is, in the first place, to make the practice known, if you should think it worth while to give my letter a place in your valuable Annals; and next to inquire of any able chemist, whether any danger can arise to the collections thus impregnated, from impure air of any kind, as smoke, animal effluvia, or dampness? My own collection is kept in a dry sunny closet, but without a fire. Some part of it has been thus poisoned above four years, and the collection of a friend of mine in Norwich has been done two or three times as long, without any bad effects that we can perceive. Some very intelligent botanists in London are of a very different opinion, and I should be glad to know whether the impure air of the metropolis may make a difference in the result of the experiment. To judge fairly, we must carefully distinguish between the inconveniences necessarily arising from the application of any spirit, as causing stains, either from the gums or colouring principles of certain plants, and the more fatal injury which may arise from a chemical decomposition of the mercurial preparation.

I am, dear sir, &c.

JAMES EDWARD SMITH.

GENTIANA ACAULIS L. FOUND IN WALES.

We are happy to insert the following communication of M. de St. Amans, a gentleman favourably known to the world by his "Voyage dans les Pyrenées," his "Eloge de C. von Linné," and other publications, and who is as intimately acquainted with the vegetable productions of alpine regions, as any botanist we know.

"M. Saint Amans, sensible à toutes les honnêtetés qu'il a reçu des naturalistes Anglais, pendant le sejour qu'il a fait dans leur pays, croit ne pouvoir mieux leur prouver sa reconnaissance, en quittant cette terre hospitalière, qu'en leur annonçant qu'il a recueilli près de Haverford West, South Wales, la *Gentiana acaulis* Linn. (*grandiflora* Lamarck), belle plante alpine qu'on n'avoit point encore trouvée sur le sol de l'Angleterre. Il espère que ces M.M. voudront bien recevoir cette communication de sa part, comme une preuve du désir qu'il a de contribuer à leur jouissance, et de l'intérêt qu'il prendra toujours à la perfection de la Flore Britannique."

OBSERVATIONS ON SOME SPECIES OF MOSSES. COMMUNICATED BY D. TURNER, ESQ.

Yarmouth, May 17, 1805.

I have much pleasure in communicating to you the following circumstances; which, I flatter myself, will prove highly interesting to such of your readers as have bestowed any attention upon the mosses, by clearing up two very doubtful points connected with that tribe.

Hypnum clavellatum, Linn. Sp. Pl. p. 1596. Hedw. Sp. Musc. p. 250. Dill. t. 85. f. 17. is the same plant as Hedwig's *Gymnostomum prorepens*, Sp. Musc. p. 35. t. 3. on the authority of specimens from Dr. Hedwig and Dr. Muhlenberg, compared with those in the Dillenian Herbarium.

Bryum Brownianum, Dicks. 4th fasc. p. 7. t. 10. f. 16. is the *Tetraphis ovata* of Funck, figured by Prof. Hedwig in the Obs. Botanicæ, and since in Sturm's Deutschland's Flora. The German botanists do not appear to have observed the capillary leaves, or probably mistook them for some other plant, among which the *Tetraphis* was accidentally growing. The teeth of the peristomium are always four, and never divide; so that it is surprising how Mr. Sowerby could be so much mistaken as to draw it like a Grimmia *, to which genus, from its habits and affinities, any botanist would be induced to refer it.

The whole of this latter discovery I owe to the communications of my excellent correspondent, the Rev. James Dalton, of Copgrove, who has ascertained the point so satisfactorily as to place it beyond the reach of doubt; and from whose most candid mind, and indefatigable researches, the greatest benefits may be expected to this branch of science. He has very lately added to the list of English plants *Bryum marginatum*, which had before only been discovered in Scotland and Ireland; and has enriched the British Muscologia with a most interesting addition, a new *Funaria*, which is alluded to in the *Muscologiæ Hibernicæ Spicilegium*, p. 106. under the name of *F. Muhlenbergii*; and of which, from the specimens he has been so good as to send me, I beg leave to offer the following specific character:

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* The leaves in his figure also appear to have a midrib.

Funaria Muhlenbergii, sub-acaulis; foliis ovatis acutis conniventibus concavis piliferis; capsulâ pyriformi obliquâ; operculo convexo-conico.

It differs at first sight from the common species, in growing always solitary, and in not attaining half its height: when young it bears a strong resemblance to *Gymnostomum pyriforme*.

ON A NEW SPECIES OF PINUS COMMUNICATED BY A. B. LAMBERT, ESQ.

Having lately been favoured with some specimens of Pines, by William Strickland, Esq. of Yorkshire, who collected them in America, I am enabled to correct an error I have committed in the sixteenth plate of my work on the Genus *Pinus*, where I have figured a cone of a new species, as belonging to Pinus Tæda. I was led into this from receiving it with the branch there figured from America, and understanding at that time that they were from the same tree. Having now received a branch belonging to the cone gathered by Mr. Strickland himself, the leaves of which are shorter and broader than those of Pinus Pumilio, and terminating in a very sharp spine, sufficiently distinguishing it from all other species, I shall call it, from the peculiar spines on the cones, PINUS pungens, *foliis geminis brevibus, acutis; strobilis ovato-conicis, aculeis squamarum elongatis subulatis superioribus incurvis, inferioribus recurvis.*

A figure of a branch, with male flowers, I hope to be able to give at some future period. Mr. Strickland found large forests of this Pine on the summit of the Blue Mountains, on the Frontiers of Virginia and N. Carolina.

From the cones he brought home he was only able to raise one tree, which is now growing at his seat in Yorkshire, above six feet high, and I have no doubt it is the only one at present in England.

M. GUERSENT'S OBSERVATION ON THE SABAL OF ADANSON.

This very interesting palm, which flowered several times at the botanic garden of Rouen, is the *Corypha minor* of Jacquin, the *Corypha pumila* of Walter, and the *Chamærops acaulis* of Michaux. M. Guersent has proved, however, that it belongs to neither of these genera, but ought to constitute a separate genus; and as such it had already been described by Adanson, who called it *Sabal*, which name M. Guersent retains. He inserts it between Euterpe *Gært.* and Chamærops, with the following essential character:

Flores hermaphroditi; spathæ partiales, stamina sex, libera, filamentis basi incrassatis; ovaria tria coadunata; baccæ tres monospermæ, duæ plerumque abortivæ; semen osseum; embryo lateralis.

There is only the abovementioned species known, which is called *Sabal Adansonii*. Its root has a singular appearance, being round and of considerable size, viz. from about three to nine inches in diameter. From this huge tubercle issue laterally the leaves, and from the centre of these the spadix. Every year one or two leaves perish; but their footstalks, persistent at their bases, approach towards one another to support the young ones, and answer at the same time the purpose of scales to protect the parts not yet developed. Nearly from the middle of the top of the root rises above the ground a conical body, furnished with several small radicles, that issue from different points, and, taking various directions, strike again into the earth: several of them wind round the old leaf-stalks, and thus keep them confined as if tied with a string. Though this prolongation of the root upwards was observed by M. Guersent in all the old plants of this palm that are found in the hot-houses, yet he suspects it to be rather a monstrosity, and probably owing to the close confinement of the globular root in the narrow pots, which must have checked the ordinary developement of that part: this is indeed so much the more probable, as neither Jacquin, nor the travellers Walter, Michaux, and Bosc, who have observed the Sabal in its native country, make any mention of such a conical prolongation. If it be really a monstrous conformation, M. Guersent has done wrong to take notice of it in the specific character, which he gives as follows:

SABAL *Adansonii*; acaulis, petiolis inermibus, foliis flabelliformibus e radice monstruosa orbiculari lateraliter ortis.

NEW GENUS OF PALMS YIELDING WAX.

M. Bonpland has laid before the National Institute a memoir on a new South American genus of palm, belonging to Polygamia Monœcia of Linnæus, and called by him *Ceroxylon*, as a translation of *Palma de Cera*, which name is given to it on account of its trunk, petioles, the lower surface of the leaves, and other parts, being entirely covered by a polished, whitish, inflammable substance, which, according to the experiments of M. Vauquelin, is a mixture of two parts of resin and one of wax. *Ceroxylon* is characterized by having monophyllous spathes, some of them including male and hermaphrodite flowers, others female ones only, but all on the same tree: the calyx is monophyllous, but divided into three equal parts; the corolla tripetalous in all the flowers. The stamens in the hermaphrodite as well as in the male flowers are generally twelve. The female flowers

contain

contain an ovary with three styles, which becomes a drupe with a single seed, bearing the embryo at its lower and lateral part. This genus is related to the *Iriartea* of the Flora Peruviana, but differs in being polygamous, and in having a monophyllous spathe and calyx and three styles.

The only species known of this genus was found by Messrs. de Humboldt and Bonpland, within a space of 24 leagues only, on the snowy summits of Tolima, of St. Juan de Quindin, in that part of the Andes which separates the Magdalen valley from that of the river Cauca in 4° 35′ N. L. These mountains are composed of granite and micaceous schiste, and on them are found isolated rocks of trap formation. With regard to the station of this palm, it is to be observed as remarkable, that while other palms are not seen beyond the altitude of 3000 feet above the level of the sea, the Ceroxylon is not found lower than 3250, and as high as 8415 feet; it occurs even in those regions where the centigrade thermometer indicates 17°, and the medium temperature in which it vegetates is from 19 to 20° of that scale, consequently 17° lower than all the other palm trees. This circumstance has induced M. Bonpland to give this plant the name of *Ceroxylon alpinum.*

This palm rises vertically to the height of about 154 feet, hence exceeds by about 30 feet the loftiest trees on record*. Its perpendicular root is thicker than the trunk, which is generally about one foot thick, and is marked its whole length with rings, the vestiges of the fallen leaves. These leaves, never more than ten in number, are pinnated, and attain the length of from 18 to 21 feet. Their stalks are triangular, and emit at each side of the base filaments from 30 to 36 inches long. The leaflets are coriaceous, numerous, and split into two parts at the top, the upper surface of a fine green colour, and the lower covered with a whitish pulverulent substance. The spadix of the male and hermaphrodite flowers is larger than that of the female, and situate above this latter. The spathe of the former is persistent, but that of the female flowers falls off soon after fecundation is performed. The fruit has rather a saccharine taste, and is much relished by birds and squirrels.

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* The Norfolk Island pine measures 210 feet below its branches. Vid. Ann. of Bot. vol. i. p. 13. Ed.

The abovementioned substance, mixed with a third part of suet, is employed in South America for making candles and tapers, which are in use chiefly at Menpoch, on the Magdalen river, at Santa Fé de Bogotá, and at Popayan. Mutis knew this substance, but was unacquainted with the tree that yields it. Vide Linn. Fil. Suppl. Pl. p. 456. From a letter of M. Emanuel Arruda to M. de Jussieu, it appears that there is another wax palm in the Brazils, known there by the name of *Carnamba*; it has palmated leaves, and cannot therefore belong to the genus Ceroxylon. (Bullet. des Sc. an xiii. n. 91.)

COUNT HOFFMANNSEGG'S FLORA LUSITANICA.

The example which Linnæus's favourite disciple set by his investigation of the plants of Spain, has been followed by Count Hoffmansegg in regard to the beautiful and exuberant vegetation of Portugal; with this difference, however, that Löfling's contributions are only fragments, while from the exertions of the latter excellent naturalist, aided by those of his fellow traveller, Prof. Link, (known also in this country by his works relative to natural history, as well as Travels in Portugal, lately translated into English,) we have to expect a complete *Flora Lusitanica*.

The following is an extract of a letter from Dr. Illiger, of Brunswick, a zealous promoter of natural history in general, and of established fame as an entomological writer: "You know that the chief object of Count Hoffmansegg, in undertaking, with Prof. Link, a journey in Portugal, which occupied several years, was to present to the world a complete Flora of that country so rich in vegetable treasures as yet unknown to the botanist. In accomplishing this task they have been so eminently successful as to leave a mere gleaning to subsequent travellers. The work is conducted by both these naturalists on a very improved plan, according to which even what was already known is placed in a new point of view. Amongst a very considerable number of nondescript species, this Flora contains many, strikingly different in their aspect from what we are used to see in European plants: besides these, there are many that have been confounded with one another, or are but imperfectly known by the defective figures of a Bauhin, Barrelier, and Clusius; and even many of the Linnæan ones stood in great need of re-examination on the spot. The synonymy has experienced the same careful attention as the specific characters, so that the too common practice of perpetuating error by copying the blunders of one author from Flora to Flora is of course completely avoided.

"The Flora Lusitanica, which bids fair to rank among the first rate productions of the kind, comprehends two thousand species, one hundred and fifty of which, being entirely new, are to be represented in faithful and elegantly executed figures: to these will probably be added fifty more, which, never having been figured in any other work, may be considered as new. The Latin text is entirely finished, and ready for the press, and will form two volumes 4to.; to which will be added a new map of Portugal, containing many emendations in the geographical part, and in the orthography of the different places, with a delineation of the author's route." Thus far Dr. Illiger: and we have only to express our fervent wish, that the obstacles to the publication of this interesting work, which have hitherto disappointed the expectations of the botanical world, will soon be completely removed.

HUMBOLDT AND BONPLAND'S BOTANICAL WORKS.

Not to interrupt the course of his narrative by scientific researches and dissertation, Mr. von Humbolt proposes to publish separately from the journal of his travels all that relates to astronomy, geognosy, zoology, and botany. Relative to the latter we have to expect, first, An Essay towards a system of geography of plants, together with a physical picture of tropical countries, founded on observations and measurements, made from 10° S. L. as far as 10° N. L. from the years 1799 to 1803 inclusive. The second work, which will be published in numbers, without attending to systematic arrangement, is, "Plantæ Æquinoctiales, per regnum Mexici, in Provinciis Carraccarum et Novæ Andalusiæ, in Peruvianorum, Quitensium, Novæ Granadæ Andibus, ad Oronoci, Fluvii Nigri, Fluminis Amazonum, ripas nascentes. In ordinem digessit A. Bonpland." In folio, cum figuris a Sellier incisis. The plates for the two first numbers are already finished: the generality of them will be uncoloured, but now and then the authors propose to give coloured plates, to illustrate monographiæ of certain genera, such as of Melastoma, &c. The history of the tropical grasses and cryptogamous plants will likewise be given with the necessary plates. The first number of the *Plantæ æquinoctiales* is to contain two plates only, representing very interesting species of palms; all the rest are to consist of ten plates. Ten numbers are to constitute a volume.

This work will be followed by a systematic arrangement, without plates, containing specific characters and descriptions of all the most interesting plants those travellers collected in Mexico, the Cordilleras of the Andes, at the Banks of the Oronoko, of Rio Negro, and the Amazon River. Besides many new genera, this collection contains an immense number of non-descript species of known genera, such as Lobelia, Melastoma, Psychotria, Quercus, Passiflora, Mimosa, &c. They have found almost all the plants described by Ruiz and Pavon, and will most probably be enabled to clear up some doubtful points that may still remain in the Flora Peruviana et Chilensis of those authors, of which we understand the fourth volume is now in the press.

ITALIAN BOTANISTS.

Hippolito Durazzo has published a catalogue of the plants of his garden at Genoa, containing many rare and curious plants.

Vincent, Griolet, and Bertholini, after having made long botanical excursions through Liguria, are said to have published a Flora of that territory.

A periodical work, in 4to. has been commenced at Genoa, under the title of "Annali di Botanica," which contains no original papers, but is calculated to make the Italian botanists acquainted with the discoveries of other nations in the science. Its editor is Domenico Viviani.

Giuseppe Marzari has presented his countrymen with a catalogue of the plants of Vicenza: Elenco delle piante, che nascono nel territorio di Vicenza. 8vo. Milano. Presso Tosi.

The trees of Toscana have found a describer in Dr. Gaetano Savi, of Pisa, who is already known to botanists by his Flora Pisana, pnblished 1798, in two vols. 8vo. Respecting the cork-tree (*Sughero*), we are told that it keeps its leaves in winter, and that another species, which he calls *Quercus Pseudosuber*, is often confounded with it.

DEATH OF PROF. GMELIN AND DR. NOHDEN.

The 1st of November, 1804, the university of Göttingen lost Dr. John Frederick Gmelin, professor of medicine and chemistry, who died in the 56th year of his age. He has ably written on many subjects of natural science, but is best known in this country by his edition of the Systema Naturæ.—About the same time died at Göttingen, too early for the sciences, Dr. John Adolphus Nöhden, known also in this country as co-editor of the Medical Journal, and author of several botanical papers.

DEATH OF PROF. MONCH.

Died the 6th of January 1805, at Marburg, in the electorate of Hesse, Dr. Conrad Mönch, professor of chemistry and botany, and favourably known by many economical and chemical works, and to botanists chiefly by his Methodus plantas horti botanici et agri Marburgensis a staminum situ describendis, &c. He was born at Cassel, August 15th, 1744. For the whole of his works, as well as those of the late Prof. Gmelin, see *Meusel's Gelehrtes Deutschland.*

DEATH OF PROFESSOR VAHL.

On the 24th of December, 1804, in the fifty-fourth year of his age, died at Copenhagen, the celebrated botanist, Professor Martin Vahl. Born in Norway, he received his first education at the school of Bergen, which place he left in 1766, to be entered a member of the university of Copenhagen. Here the study of natural history constituted his chief employ, to facilitate which he contracted a friendship with the celebrated Hans Ström, with whom he lived two years. Having reaped all the scientific advantages that the capital of Denmark could afford, he repaired to Upsal, then the fountain head of botanical knowledge, where he continued his studies under Linnæus for five years; and he has ever since held a most distinguished rank among the disciples of the Swedish naturalist.

In 1779 Vahl was appointed lecturer at the botanic garden at Copenhagen, where he taught his science with great applause for three years. After this, by the king's command, he undertook his literary travels through Holland, France, Spain, a great part of the coast of Barbary, Italy, Switzerland, and England; on which interesting tour, as well as on those afterwards undertaken, he availed himself of every opportunity of collecting valuable materials for his botanical works. Returning to Copenhagen in 1785, he obtained the professorial chair of *natural history, with* the appointment of editor of the *Flora Danica, begun by* Oeder, afterwards continued by Otto Frederic Müller. In the fulfilment of this office he undertook to explore the parts of the kingdom least known to botanists, and particularly the coasts and mountains of Norway, as far as Wardöe. In 1799 and 1800 he accomplished, at the expense of government, another tour into Holland and to Paris, on his return from which he was appointed professor of botany, and director of the botanic garden, in the place of Prof. Viborg, who had succeeded Abildgaard.

Vahl's botanical works are too familiar to our readers to require to be enumerated in this place; and of the last of all, his *Enumeratio Plantarum,* we have given a detailed account in the present number of the Annals. Besides his botanical writings there exist some papers by him, relative to other branches of natural history, to which he was by no means a stranger; among these are his observations on different birds, a description of Holocentrus lentiginosus, &c.—His library, herbarium, and manuscripts, have been purchased by the king of Denmark for the sum of 3000 dollars, besides an annual pension of 400 on his widow, and also an annuity of 100 dollars to each of his six children. His manuscripts, among which there is a complete monograph of the class Syngenesia, are intended, as we understand, to be edited by his successor, who, however, is not yet appointed. The continuation of the Flora Danica has devolved on Mr. Horneman, at present lecturer on botany at the botanic garden of Copenhagen.

DEATH

DEATH OF BARON WULFEN.

On the 17th of March, in the present year, died at Klagenfurt in Carniola, Baron Francis Xaver von Wülfen, one of the most worthy naturalists of the age. He was born at Belgrade in 1728, was the son of a Field Marshal in the Imperial service, and educated for the church of Rome. In 1762 he received an appointment, as Professor of Natural Philosophy and Mathematics, at Klagenfurt, from which time he was indefatigably employed in acquiring a knowledge of the natural history of his country, especially in mineralogy and botany. Many of his most valuable botanical productions he, with rare modesty, published anonymously in various journals. Among his manuscripts is a complete *Flora Norica*, descriptive of the plants of a part of Carniola, an *Agrostographia*, and several other works, which are said to contain a treasure of excellent observations. Many of the learned societies of Europe enrolled him among the number of their members; and his friend Jacquin named after him a genus, of the natural family of Scrophulariæ, nearly allied to Pæderota; with which Jussieu and Smith have since united it, dropping the latter name however, and preserving that of Wulfenia.

With the attainments of an accomplished scholar and skilful naturalist, Wulfen united a personal character the most amiable and noble: he was the father of the indigent, and the supporter of the oppressed; a great portion of his active life being spent in the huts of wretchedness, and the residence of the sick, where his presence alone was sure to chase away misery.

The account of his death, in a German paper, concludes with the following passage, which may serve as an enviable monument: “He was a man who did injury to no one, good to thousands; report never spoke ill of him; he was loved and revered by men of every condition, and of all persuasions. How few are there of whom so much can be said with equal truth!”

ANNALS OF BOTANY.

XIV. *Observations on Swedish Roses, by* Dr. ADAM AFZELIUS, *of Upsal*[*].

"*Species Rosarum difficillime limitibus circumscribuntur, et forte natura vix eos posuit.*"——LINN.

It has been, and we fear it still remains to be, the genius of our nation, to prefer whatever is of foreign origin, or newly arrived from abroad, to the natural produce of the country. To obtain the former no pains nor expense are often spared, whilst what the country offers almost gratuitously, though of equal value, is little esteemed. A very remote origin will often stamp an imaginary value, and whatever is the growth of a tropical clime is highly prized. Hence those who introduce the productions of foreign regions attract attention, whilst the humble investigator of our indigenous possessions often remains in obscurity; hence too the riches with which our own country abounds are neglected, and many of our native plants are still entirely unknown.

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[*] De Rosis Suecanis Tentamen primum, quod Cons. exp. Fac. Med. Ups. proponunt ADAMUS AFZELIUS Phil. et Med. Doct. &c. et *Carolus Stenhammer*, Ostro-Gothus. Upsaliæ, 1804. 4to.

If this were true only of the cryptogamous plants, those delicate minute productions of nature, often so troublesome to acquire, and when obtained so difficult to describe, it would be less surprising; but that in the very country of botany, which boasts the having given birth to the greatest botanist of the age he lived in, the author of the first Flora which merited the name, and which has served as a model for every other, it is wonderful that there should yet be found shrubs, and even trees, either entirely unknown, or too imperfectly described to be always with certainty distinguished.

Who would imagine that our Roses, so common, so familiarly known to every one, are to be reckoned in this number, and that not even one of them should have been as yet defined with sufficient exactness? That we may not be accused of making an unfounded charge, it is necessary to enter into some detail, and to subject to a closer examination all the species of Roses that are said to grow spontaneously in Sweden, and to compare them carefully, not only with one another, but likewise with other nearly related species. These are Rosa Eglanteria, R. cinnamomea, R. majalis, R. arvensis, R. spinosissima, R. villosa, R. rubiginosa, and R. canina; of these R. Eglanteria and rubiginosa, R. arvensis and cinnamomea, R. cinnamomea majalis, and spinosissima, R. spinosissima and pimpinellifolia, R. villosa and tomentosa, R. canina and another (which either is collina or a new species nearly allied to it), are so imperfectly defined, that we are unable to distinguish them with sufficient certainty to prevent one being frequently taken for another. There are indeed botanists among us who are better informed, and a few of foreign countries who have cleared up some points; but their number is small, and much is left for future observers to illustrate. Besides, no botanist of our country has professedly given a critical examination of the Swedish Roses.

But who should be so well acquainted with them as ourselves? We propose, therefore, to define them as well as we are able; but shall content ourselves for the present with some general observations tending to illustrate the history of each species; and if this essay should meet with the approbation of able judges, we engage that it shall be soon followed by a more detailed exposition and complete description of the species. Beginning with the Roses first known in our country, we shall next proceed to those discovered at later periods.

1. ROSA CANINA.

Under this name we have two species very common, and growing promiscuously in Sweden: the one with leaflets smooth on both sides, and subsolitary flowers; the other with leaflets pubescent underneath, and with clustered flowers. These differ also in habit, and are indubitably two distinct species. That von Linné[*] by Rosa canina meant the former of these, is the more certain, because in the second edition of his Flora Suecica he describes the leaflets to be *utrinque glabra*; and the specimen in the Linnean herbarium perfectly corresponds with this description, as we know by examination. He seems, however, to have followed the older Swedish botanists, in throwing together the synonyms belonging to both; of these we can only venture to quote the following as certainly belonging to Rosa canina.

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[*] As *Linnæus* agrees better with an English ear than *Linné*, and is also in most general use among our botanical writers, we have, after mature consideration, adopted the former in these Annals. Our author, a countryman and a pupil of the great naturalist, always calls him *Von Linné*, thus retaining the sign of his nobility; and in this there is the more reason, as his name prior to this period was like that of his father, Linnæus, not Linné. We confess ourselves, however, to be of the number of those who consider this great reformer of natural history as more ennobled by his writings than his titles, and shall therefore continue to use the name of Linnæus—a name under which he acquired his great celebrity—a name that will be dear to botanists wherever the science shall continue to be cultivated.—EDIT.

Curtis Flora Lond. tab. 299. cum descriptione.
Smith English Botany, vol. 14. *pag. et tab.* 992.
Palmstruch Svensk Botanik, vol. 1. *pag. et tab.* 29.

2. ROSA SPINOSISSIMA.

A dubious species, which has given rise to much dissension among botanists, now considered to be the same with *Rosa pimpinellifolia*, and therefore wholly excluded. But although even von Linné appears to have ultimately inclined to this opinion, having added to Rosa spinosissima some of the synonyms, and latterly the whole of the description of R. pimpinellifolia, yet it is evident that this was not his original opinion, as R. pimpinellifolia does not grow spontaneously in Sweden, much less *ad agrorum margines eorumque acervos passim*; nor has it the soft fruit called by the natives *Smörnjupon* (Butter-hips). It is therefore not to be doubted but that von Linné originally meant by Rosa spinosissima another species, which he appears afterwards to have forgotten, substituting for it first one *germinibus ovatis*, and afterwards confounding both these with Rosa pimpinellifolia.

Solicitous to find out the true and original species, we first consulted the older botanists that have written on Swedish plants, viz. Bromelius, Rudbeck, Linder, and Celsius, who make mention of a *Rosa pomifera minor, fructu globoso minimo*, or *Rosa sylvestris pomifera minor* Bauh., which von Linné tells us is found in Lapland. We have since satisfied ourselves, that in the places visited by him, except Rosa canina, or the abovementioned nearly related species, there is no other to be found, but one of the many species of which R. cinnamomea is composed. This must, therefore, be the true and original Rosa spinosissima Linn., which grows in the neighbourhood of

Upsal, at the places pointed out. It is a small shrub, having the branches and younger stalks very prickly, and fruit, when ripe, round, soft, sweet, and of a pale red colour. Its synonyms are:

Rosa sylvestris pomifera minor. *Bauh. Pin. p.* 484.—*Brom. Chlor. Goth. p.* 98.—*Cels. Act. Ups. vol.* 3. *p.* 38.—*Linn. Ibid. p.* 55. *et Flor. Lappon. ed.* 2. *p.* 163. (excl. Bauh. Hist.)

Cynosbatos pomifera minor fructu globoso minimo. *Rudb. Lapp. Illustr. p.* 11.

Rosa sylvestris flore rubro: Cynosbatos, fructu rotundo: Cynorrhodos *Lind. Flora Wiksberg. p.* 33.

Rosa caule petiolisque aculeatis, calycibus indivisis. *Linn. Flora Suec. ed.* 1. *p.* 148. (excl. Bauh. Hist.)

Rosa *spinosissima*, caule petiolisque aculeatis, calycis foliolis indivisis. *Linn. Spec. Plant. ed.* 1. *p.* 491. *et Flor. Suec. ed.* 2. *p.* 171. (utrobique excl. Bauh. Hist.)

3. ROSA EGLANTERIA.

Von Linné appears at first to have known no other Rosa Eglanteria but that with fragrant leaves, glandular underneath. When he afterwards became acquainted with a species which has fragrant-scented leaves, with the under surface naked, he considered the former as a mere variety of this; and at last his memory appears to have failed him so much, that he redescribed it as a new species under a different name. Hence it is that, in the most contradictory manner, we find under Rosa Eglanteria in the Flora Suecica, that the description belongs to a garden Rose with yellow flowers, which, not being indigenous to our country, ought to be erased from the list of Swedish plants, whilst the specific character, synonyms, habitat, &c. belong to a wild Rose with red flowers, since renamed Rosa rubiginosa; this has a germen not globose, but rather oblong, and so we have observed it in von Linné's own specimen. This is not only found in the neighbourhood of Gothenburg, where it is called *Neglantyr*, but likewise in Upland, Nericia, Halland, Scania, and elsewhere. To this species we think it right to restore its original name of *Eglanteria*; the one which has usurped its place may be denominated *R. Pseud-eglanteria*, rather than *R. lutea*. The real synonyms of the former, as far as we have been able to trace them, are:

Angeltorn eller Rosa med luktande blader, men med röda blommar. *Linn. Skånsk. Res. p.* 277.

Rosa *Eglanteria* aculeata, foliis odoratis subtus rubiginosis. *Linn. Spec. Plant. ed.* 1. *p.* 491. *et Flor. Suec. ed.* 2. *p.* 171. (excl. descript.)

Rosa Eglanteria *Mont. Kongl. Vet. Acad. Handl.* 1766. *p.* 239.

Rosa rubiginosa *Osbeck. Göth. Vet. Samh. Handlingar, no.* 4. *p.* 18.—*Smith English Botany, vol.* 14. *pag. et tab.* 991.—*Rössig Rosen. tab.* 10.

Rosa rubiginosa, germinibus ovatis petiolisque aculeatis, caule aculeis recurvis, foliis subtus rubiginosis. *Retz. Fl. Scand. Prodr. ed.* 2. *p.* 121.

Rosa rubiginosa, germinibus ovatis pedunculisque hispidis, petiolis cauleque aculeatis, aculeis recurvis, foliolis ovatis subtus glanduloso-pilosis. *Willd. Spec. Plant. tom.* 2. *pars* 2. *p.* 1073. *sq.**

4. ROSA VILLOSA.

What was formerly considered as but one species is now divided into two, viz. *Rosa villosa* and *tomentosa*, the former having its leaflets nearly equal, elliptic, approximate, rather obtuse; prickles thick-set, straightish; petals without veins; hairs of the peduncle and fruit stiffish; fruit large, globose, of a deep red colour; calyx persistent:—the latter having its leaflets unequal, ovate, remote, and rather sharp; prickles rare, recurved; petals veined; hairs of the peduncle and fruit soft; fruit smaller, oval, of a yellowish colour; calyx deciduous. In both the leaflets are villous on either side, have the same smell, which is stronger when rubbed, and are beset all over with glandular hairs, such as are observed also on the leafstalks and calyx.

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* We hope that the critical acumen of this able botanist has made the history of the Rosa Eglanteria so plain, that our systematic writers will not hesitate to restore this name to our English Eglantine, or Sweet-Briar, to which it is so evident that it was first applied by Linnæus, although from the failure of his memory a foreign Rose unknown in all the northern parts of Europe was afterwards suffered to usurp its place.—EDI .

Whether both these species are indigenous to Sweden, or only the second, we are not yet able to decide with certainty. With regard to *R. villosa* we have many doubts; but *tomentosa* is certainly frequently met with in many provinces, and, if we are not much mistaken, is the same which von Linné himself took for *villosa*; at least so it appears both from the description which he has given of it, in the Flora Suecica, and from our own made some years ago in London, after the Linnean specimen brought by Dr. Osbeck from Akerö, in the island of that name. Nor could we discover any other species among the many dried specimens collected near that place which we had an opportunity of examining.

How it happened that this Rose, which is also common in our neighbourhood, was not enumerated among the Swedish plants by von Linné, before the venerable Osbeck brought it from Sudermanland, and the acute Ehrhart found it near Upsal, is a circumstance which is difficult to account for, unless we suppose that, having forgotten his original Rosa spinosissima, he at the time substituted the species in question. This is so much the more probable, as we find that species subject to considerable variation, it being found of larger or less size, with folioles shorter or longer and more or less acute, and with fruit oblong, oval, roundish, of a deeper or lighter yellow colour, more or less hairy, nay sometimes entirely smooth. Indeed we have seen, not a great way distant from Upsal, near the hills of Gottsund, a shrub of which not only the fruit but likewise the peduncles were perfectly smooth. Hence the only certain synonyms of Rosa villosa that we can at present adduce, are:

Rosa villosa *Linn. Flor. Suec. ed.* 2. *p.* 463.* (saltem quod ad descriptionem.)

Rosa villosa *Ehrh. Beiträge zur Naturkunde Band.* 5. *p.* 18.

Rosa tomentosa *Smith Engl. Bot. vol.* 14. *p. et tab.* 990.

5. ROSA ARVENSIS.

We have often seen living specimens of this species in England, but never of Swedish growth. Von Linné indeed says it is a native of this country; but we very much doubt if the species he alludes to be the same as the arvensis of Hudson; and we have reasons, which we shall take another opportunity to state, for believing that he had another plant in his mind, and perhaps the one called in the Flora Danica Rosa fluvialis, which of all the known Swedish Roses approaches nearest to R. arvensis of the English botanists, although sufficiently distinct from it. Rosa arvensis not being in the Linnean herbarium, we can get no assistance from that quarter; and the figure of Flora Danica, t, 398, commonly quoted for it, really represents neither R. arvensis nor spinosissima, but *R. pimpinellifolia.*

6. ROSA CINNAMOMEA.

This, as we find it, laden with synonyms, in Willdenow's edition of the Species Plantarum, may be more properly called a collection of species than one individual. For, besides several others, it appears to include the Linnean R. cinnamomea, arvensis, and spinosissima, all of which, though they agree in habit, in their leaflets being more or less glaucous or hoary underneath, and in their fruit having a thin and soft flesh, yet differ in the places of their growth, in the time of flowering, the size, colour, and smell of the flowers, and especially in the shape of the fruit, which is either roundish, globular, oval, oblong, cylindrical, or pear-shaped; characters that we have found to be constant both in a wild and cultivated state.

That Rose which some call *collincola*, others *cinnamomea,* the late Ehrhart first pointed out to be indigenous to Sweden, and to grow about Upsal. This species we have lately sent to our friend Dr. Smith, who has since been kind enough to inform us that it is the real *cinnamomea* of the Linnean herbarium. But its flowers being scarcely possessed of any smell, it still remains doubtful whether it be the true cinnamomea of authors. Von Linné describes his plant as having sometimes oblong, at others globose fruit, and flowers either of a reddish, or else very red colour. There are, therefore, no other certain synonyms for the present than the following:

Rosa cinnamomea *Linn. Herb.*
Rosa collincola *Ehrh. Beitr. zur Naturkunde, vol.* 2. *p.* 70.
Rosa cinnamomea *Ehrh. l. c. vol.* 5. *p.* 18.

7. ROSA MAJALIS.

This species was first mentioned as a frequent inhabitant of our gardens by Professor Retzius, and afterwards as indigenous to Sweden by Dr. Osbeck; but as it belongs to the numerous tribe of the *cinnamomea,* we are not sure that these botanists have both alluded to the same species. However this may be, we shall defer the description of *majalis* to another opportunity, when we propose to treat of all the related species together; in the mean time we may give for a certain synonym

Rosa majalis *Osbeck Göth. Vetensk. Samh. Handl. vo. iv. p.* 18.

8. ROSA RUBIGINOSA.

Of this species we have already said enough, and have here only to add, that this also was first distinguished from *R. lutea*, and added to the number of Swedish plants, by Dr. P. Osbeck. It is now more than twenty years since this accurate naturalist wrote to us upon this subject, and sent us at the same time ripe seeds, from which shrubs were raised that are still living in the academical botanic garden at Upsal.

XV. *Prodromus of Ætheogamia**, *or of a Treatise on those Families of Plants whose Fructification is extraordinary. By* A. M. F. J. PALLISOT-BEAUVOIS.

FAMILY OF MOSSES.

THE *mosses* appear to our eye more perfect plants than the Algæ, Fungi, Lichens, and some of the Hepaticæ; being, like the greater part of vegetables, furnished with roots, stalks, leaves, and flowers. Of the latter organs, in this family, the older botanists had but a very imperfect idea; but since the time of Micheli they have been better determined by modern observers, who have described both male and female flowers. Hedwig, who fully merits the high reputation in which he is held as an observer, has carried his researches still further: what Micheli and Linnæus supposed to be the anther, he considers as the female flower, and, on the other hand, what the former naturalists take for the female is, in his opinion, the real *male flower* of these plants. This system, which cannot be applied to all the species, is opposite to that of Dillenius, Micheli, Linnæus, Haller, &c., all of whom deserve to be regarded as very respectable observers. I combated Hedwig's system myself as early as 1782, since which time it has met with other opponents, of whom I need only mention Gærtner and Ventenat. The work of which I am now about to give an abstract, and which is the result of more than thirty years' observation, presents the subject in a point of view diametrically opposite to the ideas of Hedwig. Impartial botanists, after comparing them together, will decide which opinion is the most natural and the most probable of the two.

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* *Aethéogamia*, derived from αηθης, *insolitæ*, and γαμος, *nuptiæ*, is a term which I have substituted for that of Cryptogamia. This class consists of seven orders, which I shall publish in succession, viz. the Algæ, Fungi, Lichens, Hepaticæ, Mosses, Lycopodia, and Ferns. I give here only a treatise on the fifth of these orders (the mosses), which was finished long ago, and presented to the National Institute in Germinal of the year xi. It is the result of several years' observations, and I hasten to submit it to the public on account of the difference that subsists between my system and that of Hedwig, which is not applicable to all the species, and involves the study of these plants in great difficulties. *Mag. Encyclop. n.* 19. *an xii.*—AUTHOR.

We have abstained from adding any remarks to this paper, which however well merits the consideration of botanists. Perhaps some observations on it will be given at another opportunity.—ED.

As it is not my intention to bring forward either the arguments for confuting the system of Hedwig, or supporting my own until I shall have published the other families of the Ætheogamia, the reader may in the mean time consult the article *Stachygynandrum,* in the second number of my *Flore d' Oware et de Benin.*

The flower of the mosses, essentially the same in all the genera and species, does not differ externally, except in the number and form of the parts accessory to the immediate organs of generation. It is an hermaphrodite flower, club-shaped, and placed at the summit of the stalks, or in the axils of the leaves: it is necessarily composed of five parts, which are always found, and of five others, of which either a part or the whole occur, in such a manner that in some mosses we count six, in others seven, or eight, and sometimes even nine or ten. This flower is constantly either globular, oval, or cylindrical, terminating a tube more or less long, or supported by a soft and membranous peduncle, and is called the *urn*. The ten parts distinguishable in the flowers of the mosses are the following:

1. The *veil*.—A bell-shaped or hood-like membrane, which is villous, with hairs more or less long, or smooth; even or striated; transparent or opaque; always dry, and covering the urn either wholly or in part. In the early state of the flower the veil envelops all the parts of which it is composed, except the perichætium in such mosses as are furnished with one. It may be compared to a double outer corolla, but with regard to its functions only; for, considered with respect to insertion, form, and substance, it cannot, strictly speaking, be compared with any known part of other vegetables; in some species it falls off early, in others it is only detached at the same time with the operculum or lid; and in a small number (the *Encalypta*) it is often persistent even after maturity. In some of the *Hymenodes* it is found double.

2. The *lid*.—An organ almost peculiar to this family of plants, which terminates the urn and closes its orifice; its form is conical, in some flat or obtuse, in others elongated, sometimes awl-shaped or acuminate; or lastly, expanded at the base and furnished at the centre with a point more or less extended, when it is called *mamillare*. The time of its falling off is that of the maturity of the flower, and of the fecundation of the seeds. It is permanent in two genera only, viz. Phascum, the fecundation of which is performed internally, and Tetraphis, in which it splits into four equal tooth-like segments.

3. The *urn*.—This name is particularly given to the small head terminating the club, which issues from the summit of the stalk or axils of the leaves; it serves as a second integument to the pollen and to the capsule. It may be

compared to a real corolla, which is tubular in the greater number, and peduncled in a few, which naturally connect the Hepaticæ with the Mosses. It is globular or oval, pear-shaped or cylindrical; naked at its orifice or bordered by a simple (outer) peristome; straight, inclined, or recurved; either simple or furnished at its base with an enlargement called an *apophysis*. The tube is either shorter or longer than the urn, or of the same length with it; it is straight, curved, or bent back at the tip.

4. The *pollen* or *fecundating dust*.—An assemblage of minute, round, rough grains, contained in a peculiar membrane, covered by the urn. This membrane is open in the Entopogoni and Diplopogoni, and furnished at its orifice with ciliæ (inner peristome); entire and bursting in the Apogoni, the Ectopogoni and Hymenodes. The pollen surrounds the capsule, which occupies the centre of the urn: it explodes with one or more spurts in the mosses that have a peristome. Its immediate covering, which may be called the antheriferous sac, has the form of the urn; in the species of Polytrichum and in most of the Hymenodes it is square; in all it embraces closely the peduncle of the capsule, with which it appears to be intimately connected.

According to this organization the mosses would be arranged in the sexual system among the gynandrous polyandrous plants, where they might form two new orders, viz. Gynandria Monadelphia (Barbula, Hypnum, Mnium, &c.), and Gynandria Polyadelphia (Cicilidotus); to which a third and fourth order might be added, containing the Apogoni, Ectopogoni, and Hymenodes. This arrangement, being not very natural, I am far from proposing seriously; it is only brought forward to show the analogy the mosses have to other plants.

5. The *pistil* or *capsule* (*Columella* Hedw.).—An organ of various forms, occupying the centre of the urn, enclosed within the antheriferous sac, and surrounded by the pollen.

No style, properly speaking, can be discovered, except perhaps in Splachnum, in which it appears sometimes in a prismatical form. The stigma is capitate, four- or five-cleft, pointed and conical in some Hypna; simple and not very apparent in Vorticella. The ovary is oval or oblong, smooth or villous. It is generally supported on a peduncle that takes its rise from the sheath, traverses the tube, and penetrates as far as to the urn, where it sometimes divides into several branches that unite again at the base of the ovary; at other times it traverses a green fleshy substance, that occupies the bottom of the urn, and on which the capsule appears to rest.

N. B.—The five parts above described are essential to the flower of all the mosses: in the Apogoni we find genera in which no others are distinguishable; but in the other sections these five more essential organs are accompanied by one or more of the following five parts, not less necessary to those genera that are furnished with them. The absence or presence of these last parts, and the diversity of their forms, serve to establish the sections and to distinguish the genera; and in the study of these plants it is necessary to be thoroughly acquainted with them.

6. The *teeth* (or *outer peristome*).—These parts, situated at the orifice of the urn, form a border to the outer covering; they are generally lanceolate, pointed, variable in number (from eight to sixty-four), single or in pairs, or each split into two; rarely short and obtuse. In such mosses as are furnished with these organs, the teeth contribute essentially to fecundation, by means of a regular movement of irritability, by which they alternately recede from and approach each other. In the Hymenodes the teeth are immoveable, and accompanied by an horizontal membrane; in the Diplopogoni they are united with the ciliæ; in the Ectopogoni they are distinct; and they are wanting in the Entopogoni and Apogoni.

7. The *ciliæ* (or *inner peristome*).—At the orifice of the urn the ciliæ form a border to the inner membrane, of which they appear to be only a continuation. They are filiform, or silk-like (*soyeux*), straight or spiral, generally eight, sixteen, or thirty-two in number, distinct or united into one or several bundles, and assist like the teeth, separately or conjointly with them, in the fecundation of the seeds. Their irritability is less, and consequently their movement not very evident. The ciliæ are united with the teeth in the Diplopogoni, distinct in the Entopogoni, and are wanting in the Hymenodes, the Ectopogoni and Apogoni.

8. The *horizontal membrane*.—An organ peculiar to the section of Hymenodes, in which it supplies the place of an inner peristome. It is delicate, supported by the teeth, and perforated like a sieve.

9. The *sheath*.—There are two genera only in which this organ has not been observed. It is a small cylindrical or tubercular pipe, in which is inserted the tube of the urn. Linnæus has confounded this organ with the real peristome in some genera. It may be compared to an inner calyx, in which the urn, and all its parts above described, are enveloped at their first formation.

10. The *perichætium*.—This organ, which surrounds the sheath, is a real calyx, composed of several leaflets that are generally membranous, constantly different from the leaves, and more or less imbricated. It is not every moss that is furnished with this part, which serves to distinguish certain genera.

Micheli has observed that the Polytricha, Mnia, and Splachna, bear starry branches, in which are found small succulent articulated bodies, which he considered as the female flowers. Hedwig has compared with these small bodies those which he found in the axillary gems of Hypna and some other mosses, and which he considered to be male flowers, as we have before observed. But they are not found in all mosses; and this exception, even supposing they were filled with pollen, which I could never perceive, would be a sufficient refutation of his system. I therefore think with Dillenius that these small bodies are nothing but gems, similar to those found in some Liliaceæ, in Polygonum Bistorta, &c. and entirely foreign to the essential organs of fecundation. In consequence of this, they are not in my system applied to for generic characters, being at most only of use in distinguishing some species.

The flower of the mosses is indeed only to be looked for in the urn and its concomitant organs; it is a hermaphrodite flower, of the same conformation in all the species as far as relates to the five most essential parts, viz. the veil, the lid, the urn, the pollen, and the pistil. The teeth and ciliæ, in those mosses that are provided with them, perform a principal part in the act of fecundation. In effect, as soon as these organs are no longer retained by the lid, they begin to move one among another, separating and approaching each other alternately as long as the urn contains pollen and seeds. I have many times repeated this observation, of which I have a witness in M. Adanson, one of the commissaries of the academy nominated to examine the memoir presented by me in 1782. The following is the result and the proper idea to be formed of the process of fecundation in these plants.

In all mosses with a peristome, the pollen and seeds are discharged with an explosion the instant the lid falls off; but as from their respective position these essential parts might happen to be discharged without coming into contact and mingling with each other, and of course without effecting fecundation, nature has provided against this by the teeth and ciliæ, which prevent the effect of too quick an explosion. In the Ectopogoni the explosion is performed in several successive jerks, during which the teeth connive to force the pollen to remain at the orifice, and then open successively to allow a free passage after it has been mixed with the seeds. In the Entopogoni the ciliæ, almost constantly spiral, perform the same function by alternately straightening themselves and curling up. In the Diplopogoni, in which the discharge is more sudden, and seems to be made at one explosion, the pollen is retained by the ciliæ being united in a cone, while the teeth move as in the Ectopogoni, thus successively hindering and favouring its escape.

Two objections offer themselves, and have been made against this theory:—1. In all vegetables *impregnation* takes place within the flower, before the complete formation of the seeds, which fall from the capsules perfectly fecundated. 2. If it be true that the teeth and ciliæ contribute so much towards the fecundation of the seeds, and this in a manner so very different from what we see in all other vegetables, how can this fecundation be effected in the Apogoni, which are destitute both of teeth and ciliæ?

The example of some reptiles and fishes, whose eggs are impregnated by the male after their discharge from the female, and not, as in almost all other animals, within her body, may prove an answer to the first objection, so much the more satisfactory as it establishes a striking analogy; at the same time it justifies the appellation, *Ætheogamia* (*nuptiæ insolitæ*), which I have given to the twenty-fourth class of the Linnean system.

To the second objection, which is more serious in appearance, I answer by a fact easily ascertained, and very much in favour of the theory proposed: it is, that in the mosses without peristome, the seeds and pollen do not explode, but fall out of the urn after the lid drops off, just as grains of corn, sand, &c. would fall out if the bag containing them were squeezed at the bottom. And in fact, on taking a flower of a Gymnostomum, arrived at maturity, and cautiously separating the lid without tearing any part, the pollen will be immediately seen to swell, rise up, and cover the orifice of the urn in such a manner that the seeds contained in the capsule, which bursts at the same moment, must be mixed with it. If, on the other hand, we take a moss provided with a peristome, and subject it to the same examination, the pollen will be seen to come out with an explosion, and the teeth to move in the manner above described, so as alternately to impede and facilitate its discharge.

Some botanists have remarked that motion in the teeth is manifest even a long time after the urn is emptied. This is indeed true; but such motion is only the effect of a moister air operating on the organs which, though inanimate, are folded together, rolled up, and curled by drought: this accidental movement should, therefore, not be confounded with the natural and regular motions of irritability, which, beginning with the fall of the lid, last no longer than the period necessary for the fecundation of the seeds.

SECTION I.

APOGONI.—Urn destitute of peristome.

Obs.—The *Apogoni* connect the Mosses with the Hepaticæ, the family immediately preceding them in the natural arrangement. Indeed Andræea has an urn that splits in four equal parts, and is supported on a white peduncle, soft and membranous like that of the Jungermanniæ. The same sort of peduncle is found in Sphagnum; it becomes more solid in Phascum, and thus approaches nearer to the tube of the urn of other mosses.

a. *Urn without tube.*

Genus 1. **Andræea** Ehrh. Hoffm. Hedw. *Jungermannia* Dill. Linn. Juss. Lam. Gmel.

Veil bell-shaped, short, terminated in a point; *lid* conical, obtuse; *urn* peduncled, oval, dividing into four equal, lanceolate, concave parts, united at the summit by the lid; *peduncle* white, membranous; *capsule* top-shaped, inferior; *style* filiform, the length of the urn; *stigma* simple, minute.

Stalks divided or branched; flowers terminal; leaves scattered, imbricated.—Terrestrial plants growing sometimes on stones. This genus consists of two species, *Jungermannia rupestris* and *alpina* Linn.

Genus 2. SPHAGNUM Dill. Linn. Juss. Lam. Gmel. Vent. Hedw. Bridel.

Veil hood-shaped, very small, falling off very soon; *lid* short, almost flat; *urn* peduncled, spherical, or oval; *peduncle* white, soft, membranous, transparent; *perichætial folioles* long lanceolate, pointed.

Bog plants. Stalks branchy; leaves imbricated; flowers terminal or lateral.—Species: *Sphagnum palustre* L. or *cymbiforme et capilliforme*, Hedw., *recurvum, magellanicum, condensatum, javanense,* Hedw. Brid., and *clandestinum,* a new species which I have found in the rich collection of M. de Jussieu, and of which specimens have been lately brought from the Isle of France by M. Bory-St.-Vincent.

Genus 3. PHASCUM Linn. Juss. Lam. Gmel. Vent. Hedw. Bridel.

Veil hood-shaped, small; *lid* conical, awl-shaped, persistent; *urn* peduncled, oval or globular; *peduncle* short, of a greenish white colour, membranous, transparent; *perichætium* none.

Terrestrial plants. Stalks very short, almost none, simple or divided; leaves scattered, open, generally enveloping the urn; flowers terminal.

These plants, among which the Hyssop of Solomon has been supposed to be recognised, are the smallest of any we know, except some almost imperceptible fungi. Species: *Phascum acaulon, subulatum,* Linn., *cuspidatum, curvicollum, piliferum, crispum, cohærens, longifolium, patens, alternifolium, nitidum, stoloniferum, serratum, confervoides,* Hedw. Brid.

b. *Urn tubular.*

Genus 4. GYMNOSTOMUM Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent.

Veil hood-shaped, sometimes almost bell-shaped; *lid* conical, more or less extended and pointed, sometimes flat; *urn* oval or pear-shaped, straight; *tube* middle-sized, sometimes very short; *perichætium* none; *sheath* oblong.

Terrestrial plants. Stalks simple or little branchy; flowers terminal, leaves scattered.—Species: *Bryum truncatulum, pyriforme, æstivum,* Linn.; *Hedwigia lapponica*; *Gymnostomum microstomum, pennatum, curvirostrum, stelligerum, obtusum, prorepens, japonicum, tenue, rutilans, ovatum, pulvinatum, fasciculare, Heimii,* Hedw. Brid. and *splachnoideum et dilatatum* P. B. two new species from North America.

Genus 5. HEDWIGIA Hedw. Brid. *Bryum* Linn. Juss. Lam. Gmel. Vent. *Anictangium* Hedw. Op. posth.

Veil bell-shaped; *lid* mammillary; *urn* oval; *tube* very short, enveloped, like the urn, in the folioles of the perichætium.

Terrestrial plants, or growing on trees and stones. Species: *Hedwigia ciliata* Hedw. Brid.; *nervosa,* and *integrifolia* P. B. two new species brought by me from North America.

Genus

Genus 6. ANICTANGIUM Hedw. Op. posth. *Sphagnum, Hypnum* Linn. Juss. Lam. Gmel. Vent. *Hedwigia* Hedw. Brid.

Veil bell-shaped; *lid* mammillary; *urn* oval, straight; *tube* straight, short; *sheath* cylindrical, wide, open, almost as long as the tube; *perichætium* none.

Aquatic or terrestrial plants. Stalks simple or branchy; leaves scattered; flowers lateral. Species: *Sphagnum alpinum*; *Hypnum aquaticum*, Linn.; *Sphagnum simplicissimum* Brid. *Anictangium setosum, cirrhosum,* Hedw. Op. posth.

Genus 7. TETRAPHIS Hedw. Brid. *Mnium* Dill. Linn. Juss. Lam. Gmel. Vent.

Veil bell-shaped, channelled, cleft on one side, toothed at the lower margin; *lid* conical, oblong, dividing into four equal, tooth-shaped, permanent parts; *urn* rather tapering near the top, straight; *tube* straight, middle-sized; *sheath* enveloped in the perichætium.

Terrestrial plants. Stalk simple, without leaves at the base; steril branches starry, of two sorts; flowers terminal; leaves scattered.—The only species is *Mnium pellucidum* Linn. See the learned dissertation of Schmiedel.

SECTION II.

ECTOPOGONI, from Εκτος *extra*, and πωγων *barba*.—Orifice of the urn beset with teeth, or a single external peristome.

a. *Teeth double or split.*

α. Veil hood-shaped.

Genus 8. FISSIDENS Hedw. Brid. *Hypnum* Dill. Linn. Juss. Lam. Gmel. Vent.

Lid acuminate, almost mammillary; *teeth* eight or sixteen, slit about half way down into two bristle-shaped segments;

Digitiz

segments; *urn* oval, straight, or slightly inclined; *tube* middle-sized, surrounded by a perichætium with folioles bent back at the tip, sometimes herbaceous.

Terrestrial plants. Stalks simple or nearly so; leaves imbricate, two-ranked; flowers lateral, terminal, or radical. Species: *Hypnum bryoides, adianthoides, taxifolium, asplenioides*, Linn.; *Fissidens exilis, osmundoides, palmatus, polypodioides, subbasilaris, Novæ-Hollandiæ, Webera semicompleta?* Hedw. Brid.: to which I have added some species which I have observed in the collections of Messrs. Boileau, la Billardière, Dupetit-Thouars, and Bory-St.-Vincent.

Genus 9. CECALYPHUM. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Fissidens, Dicranum* Hedw. Brid.

Lid conical, more or less extended, with an awl-shaped termination; *teeth* 16, cleft half way down; *urn* oval, oblong, or cylindrical; *tube* short, middle-sized, or very long; *sheath* oblong, enveloped in a perichætium, with folioles long, membranous, straight, imbricated.

Stalks simple or divided; flowers terminal or semilateral; leaves scattered, straight, or bending one way.

Terrestrial plants or growing on trees.—Species: *Bryum scoparium, Hypnum sciuroides*, Linn.; *Dicranum undulatum* Hedw. Brid. *Cecalyphum tortile, pallidum, scrophulosum et pericl etiale*, new species, two of which were introduced by me. To these may perhaps be added some species of Dicranum, when they shall have been more carefully examined, and other mosses brought by different travellers.

Genus 10. DICRANUM Hedw. Brid. *Bryum, Mnium* Dill. Linn. Juss. Lam. Gmel. Vent. *Fissidens* Hedw. Brid.

Lid conical, extended, obtuse or awl-shaped; *teeth* 16, divided about half way; *urn* oval or cylindrical, straight or slightly inclined; *tube* middle-sized, or very long; *sheath* oblong or tubercled; *perichætium* none.

Terrestrial plants. Stalks simple or nearly simple; flowers terminal or semilateral; leaves scattered, straight, or bent, secund.—Species: ***Bryum heteromallum, flexuosum, pellucidum, simplex, pulvinatum, glaucum, Celsii, Mnium purpureum,*** Linn. ***Dicranum subulatum, interruptum, flagellare, longifolium, orthocarpum, curvatum, crispum, palustre, laxum, intermedium, rigidulum, purpurascens, condensatum, pusillum, latifolium, ovatum, spurium, virens, montanum, bipartitum, Schreberianum, xantodum, introflexum, albidum, strumiferum, cygneum, tortile, candidum, ambiguum, cerviculatum, falcatum, fasciatum? splachnoides, Billarderii, aquaticum,*** and several other species introduced by the travellers already cited.

Genus 11. DIDYMODUM Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Trichostomum, Swartzia* Hedw. Brid. *Cynontodium* Hedw. Op. posth.

Lid conical, awl-shaped; *teeth* eight or sixteen, united in pairs at their base, segments filiform; *urn* oval or cylindrical, straight or slightly inclined; *sheath* oblong or tubercled; *perichætium* none.

Terrestrial plants. Stalks simple or nearly so; leaves scattered, generally capillary; flowers terminal or semilateral.—Species: ***Didymodum homomalum, rigidulum, pusillum; Trichostomum pallidum,*** Hedw. Brid.

Genus 12. SWARTZIA Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Cynontodium* Hedw.

Lid conical, pointed; *teeth* eight or sixteen, lanceolate, standing in pairs at their base, but not united, nor double; *urn* straight or slightly incurved, oval or cylindrical; *tube* long, straight; *sheath* oblong or tubercled; *perichætium* none.

Terrestrial plants. Stalks simple or nearly so; leaves generally capillary; flowers terminal or semilateral.—Species: the *Cynontodia* of Hedwig, except *Cyn. cernuum*; *Swartzia capillacea, trifaria, inclinata, trichostomum, pusillum, didymodum* Hedw. Brid.

Genus 13. CYNONTODIUM Hedw. *Trematodon* Rich.

Lid conical, short or acuminate-awl-shaped; *teeth* eight or sixteen, standing near together by pairs at their base, but not united nor double; *urn* oval, pear-shaped, more or less attenuated at its base, inclined or recurved, containing a fleshy substance, on which the capsule rests; *tube* long, arched, and bent back at the top.

Terrestrial plants. Stalks simple or divided; leaves scattered; flowers terminal or semilateral.—Species: *Cynontodium cernuum* Hedw. *Trematodon longicaule* Rich. and a small variety of the latter, brought by me from the United States of America.

β. Veil bell-shaped.

Genus 14. TRICHOSTOMUM Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Dicranum* Hedw. Brid.

Veil short, bell-shaped, lacerated or fringed at the border; *lid* long, awl-shaped; *teeth* sixteen, filiform, almost like spun silk, or in some species, which may perhaps constitute a distinct genus, lance-shaped, split down to the base or half way; *urn* oval, straight; *tube* middle-sized, straight; *sheath* oblong or tubercular; *perichætium* none.

Terrestrial plants, or growing on the stems of trees. Stalks simple or branchy; leaves scattered; flowers axillary, semilateral or terminal.—Species: *Bryum hypnoides* Linn. and its varieties; *Trichostomum tenue, cylindricum,* Hedw. Op. posth. *glaucescens, ericoides, aquaticum, canescens, heterostichum, lanuginosum, fasciculare,* Hedw. Brid. *brevifolium, angustatum, tortum, microcarpum, obtusum, indicum,* Brid. *Dicranum ovatum, aciculare,* Hedw. Brid. and *Trichostomum obtusifolium* P. B. a new species from the United States.

Genus 15. SPLACHNUM Linn. Juss. Lam. Gmel. Vent. Hedw. Brid.

Lid short, conical, obtuse; *teeth* eight or sixteen, lanceolate, approaching by pairs at the base, generally reclining; *urn* furnished at its base with a considerable swelling enlargement, either globular, pear-shaped, or umbelliform, cylindrical at the top, straight or slightly drooping; *tube* long, straight; *pistil** projecting beyond the orifice of the urn; *ovary* oval or globular; *style* prismatic; *stigma* large and capitate.

Terrestrial plants. Stalks simple or nearly so; leaves scattered; flowers terminal; some steril branches terminating in stars or roses.—Species: *Splachnum ampullaceum, vasculosum, luteum, rubrum,* Linn. *ovatum, mnioides, Frœlichianum, magellanicum, urceolatum, attenuatum, serratum, angustatum, Brewerianum, bavaricum,* Hedw. Brid. and *pusillum,* a nondescript species communicated to me by M. de Jussieu.

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* I do not describe the pistil in all the genera, because in some it is subject to vary; and indeed nothing certain can be established in this respect until it shall have been examined in all the species. This organ being, however, very nearly always of the same conformation in *Splachnum*, I have thought it right to give the particulars; and the more especially as it appears to me to convert into a proof the great mass of probabilities and analogies, by which my opinion respecting the fructification of the mosses is supported.

b. *Teeth simple.*

α. Veil bell-shaped.

Genus 16. ENCALYPTA Hedw. Op. posth. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Leersia* Hedw. Bridel.

Veil longer than the urn, extinguisher-shaped, even, smooth, persistent, entire, fringed, or radiated at the margin; *lid* long, subulate; *teeth* sixteen, rather filiform and close together; *urn* cylindrical, somewhat smaller at the tip; *tube* middle-sized, straight; *sheath* oblong, *perichætium* none.

Terrestrial plants. Stalks simple or nearly simple; leaves scattered; flowers terminal or semilateral.—Species: *Bryum extinctorium* Linn. *Leersia ciliata, streptocarpa,* Hedw. Brid. *Encalypta crispata* Hedw. Op. posth.

Genus 17. GRIMMIA Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent.

Veil bell-shaped, opaque, brownish, lacerated at the margin; *lid* almost mammillary; *teeth* sixteen, simple; *urn* spherical or oval; *tube* short; *sheath* tubercular; *perichætium* none.

Terrestrial plants, or growing on trees. Stalks rather simple or branchy; leaves scattered; flowers terminal or lateral. Species: *Bryum apocarpon* Linn. *Grimmia alpicola, plagiopodia, recurva, cribrosa,* Hedw. Brid. and a new species brought by me from North America.

Genus 18. FUNARIA Hedw. *Mnium* Linn. Juss. Lam. Gmel. Vent. *Kœlreutera* Hedw. Brid.

Veil nearly bell-shaped, split on one side; *lid* short, almost flat, marked on its lower surface with the impression of the teeth; *teeth* sixteen, lanceolate, horizontal at the orifice of the urn, obliquely rotate and wheel-shaped; *urn* pear-shaped, reclining; *tube* slender, long, recurved, and reflected; *capsule* nearly spherical, obtuse, supported by a peduncle, the end of which divides in the urn; *sheath* tubercular; *perichætium* none.

Terrestrial plants. Stalks simple; leaves scattered; flowers terminal; steril branches starry.—Species: *Mnium hygrometricum* Linn. *Funaria flavicans* Rich.—Mich. Fl. Amer.

Genus 19. LASIA (λασιος hirsutus). *Pterigynandrum* Hedw.

Veil villous and hispid with long hairs; *lid* conical, pointed; *teeth* sixteen, simple, lanceolate, membranous; *urn* straight, oval; *tube* middle-sized, straight; *sheath* tubercular, wrapped up in a *perichætium*.

Plants growing upon trees. Stalks branchy; leaves scattered; flowers lateral, axillary.—Species: *Pterigynandrum trichomitrium* and *subcapillatum* Hedw. Op. posth. both from North America.

β. Veil hood-shaped.

Genus 20. PTERIGYNANDRUM Hedw. Brid. *Hypnum* Dill. Linn. Juss. Lam. Gmel. Vent.

Characters of the preceding genus, except that the veil is hood-shaped and smooth.—Species: *Hypnum gracile, julaceum, filiforme,* Linn. *Pterigyn. hirtellum, intricatum, ciliatum, fulgens ? patens ?* Hedw. Brid. *catenulatum, ulgirianum, aureum,* Brid. and some nondescript species.

Genus 21. BRYUM Dill. Linn. Juss. Lam. Gmel. Vent. *Mnium* eorund. auctor. *Octoblepharum, Grimmia, Weissia, Leersia,* Hedw. Brid.

Lid conical, more or less pointed; *teeth* eight or sixteen,

teen, lanceolate; *urn* oval; *tube* middle-sized; *sheath* tubercular; *perichætium* none.

Terrestrial plants, or on trees. Stalks simple or nearly so; leaves scattered; flowers terminal or semilateral.—Species: *Bryum paludosum, viridulum; Mnium cirrhatum* Linn. *tetragonum, Daviesii, reticulatum* Dicks. *Weissia crispula rupestris, Dicksonii, crispata, recurvirostra, nigrita, acuta, pusilla, fugax, Starkeana, calcarea, microodonta, controversa, virens, heteromalla, radians; Leersia lanceolata, octoblepharum,* Hedw. Brid. *Bryum gymnostomoides* P. B. and other new species introduced by the above mentioned travellers.

SECTION III.

ENTOPOGONI (εντος intra, πωγων barba).—Orifice of the urns furnished with ciliæ only, or with an inner peristome.

Genus 22. Streblotrichum (στρεβλος tortuosus, and ϑριξ, τριχος pilus), *Bryum, Mnium,* Dill. Linn. Juss. Lam. Gmel. Vent. *Barbula* Hedw. Brid.

Veil cuculliform; *lid* subulate, pointed; *ciliæ* distinct, spiral; *urn* oval or cylindrical, straight; *tube* long, straight; *sheath* oblong or tubercular, inclosed in a perichætium.

Terrestrial plants, or growing on walls. Stalks simple or nearly simple; leaves scattered; flowers terminal or semilateral.—Species: *Mnium setaceum* Linn. *Barbula convoluta, humilis,* Hedw.

Genus 23. Tortula Hedw. Brid. *Bryum, Mnium,* Dill. Linn. Juss. Lam. Gmel. Vent. *Barbula* Hedw. Brid.

The characters of the foregoing genus, but without perichætium.

Species: *Bryum murale, unguiculatum, tortuosum;*

Mnium cirrhatum Linn. *Barbula acuminata, Saussuriana, atlantica, fallax, dubia, nervosa, curta? stricta, conica, apiculata, rigida, agraria*; *Tortula æstiva, acuminata, hercynica, linoides, tortuosa, flavescens*, Hedw. Brid. and several other as yet undescribed species.

Genus 24. BARBULA Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Tortula* Hedw. Brid.

Characters of the preceding genus, but the spiral ciliæ united in one cylindrical bundle, distinct only at the top.

Species: *Bryum rurale, subulatum*, Linn.; *Barbula ericetorum* Hedw. Brid. and a new species brought by me from North America.

Genus 25. CINCLIDOTUS (κιγκλιδῶτος cancellatus). *Trichostomum fontinaloides* Hedw. Brid.?

Veil bell-shaped; *lid* conical, pointed, almost mammillary; *ciliæ* spiral, united into several unequal, reticulated bundles.

An aquatic.

Genus 26. HYMENOPOGUM (ὑμην membrana, πωγων barba). *Buxbaumia foliosa* Hedw.

Veil small, cuculliform; *lid* conical, pointed; *ciliæ* united into a plaited membrane; *urn* oval, swelled on one side near its base, fringed at the orifice; *tube* short, placed obliquely.

Terrestrial plant, very minute. Stalk scarcely any; leaves of two kinds.

SECTION IV.

DIPLOGONI (διπλοῦς duplex, πωγων barba).—Orifice of the urn furnished with a double peristome, teeth externally, and ciliæ internally, the latter either distinct or united.

a. *Ciliæ united into a plaited or reticulated membrane.*

α. Veil bell-shaped.

Genus 27. BUXBAUMIA autorum.

Lid thick, conical, obtuse; *teeth* sixteen, short, blunt, and as it were truncated; ciliæ united into a plaited membrane, distinct at the end; *urn* oval, gibbous, membranous, flat on one side, convex on the other; *tube* short, oblique.

This singular genus, which I have not had an opportunity of examining in fresh specimens, appears to merit the attention of the botanical observers. Species: *Buxbaumia aphylla*. It has no leaves.

Genus 28. FONTINALIS autorum.

Lid mammillary; *teeth* sixteen, lanceolate; *ciliæ* united into an inverted cone and reticulated; *urn* oval, surrounded at its base by the imbricated leaflets of the perichætium; *tube* very short, scarcely any.

Aquatic plants. Stalks branchy; leaves scattered; flowers terminal or axillary.—Species: *Fontinalis antipyretica, minor, squamosa,* Linn. *falcata* Hedw. and *subulata* P. B. a new species found by me in Georgia in North America.

β. Veil hood-shaped.

Genus 29. BARTRAMIA Hedw. Brid. *Mnium, Bryum,* Linn. Juss. Lam. Gmel. Vent.

Veil minute; *lid* short, wide; *teeth* sixteen, lanceolate; *ciliæ* united into a plaited membrane; *urn* spherical, inclined, oblique; orifice placed obliquely; *tube* middle-sized; *perichætium* none.

Terrestrial or bog plants. Stalks simple or nearly so; leaves scattered; flowers terminal, semilateral, or radical.—

Species: *Mnium fontanum*; *Bryum pomiforme*, Linn. *Bartramia marchica*, *Halleriana*; *Mnium sphærocarpum* Hedw. *reticulata* P. B. (from the Straights of Magellan) *subintegrifolia* et *radicalis* P. B. The last species is from the United States.

Genus 30. ORTHOPYXIS (ορϑος rectus, πυξις pyxis). *Mnium* Dill. Linn. Juss. Lam. Gmel. Vent. *Arrhenopterum*, *Bryum* Hedw.

This genus differs from the preceding only in its urn, which is oval-oblong, straight, but somewhat falcated, and in the orifice, which is not placed obliquely. From the following it differs by its straight urn, destitute of an inner fleshy substance, and by the tube being always straight. The distinguishing characters are not very striking; but the species of which the genus is composed have a particular habit, which keeps them distinct from the two genera to which they seem to be nearly allied: they are, *Mnium androgynum*, *ramosum*, *palustre*, Linn. *Bryum macrocarpum*, *squarrosum*; *Arrhenopterum heterostichum* Hedw.

Genus 31. MNIUM Dill. Linn. Juss. Lam. Gmel. Vent. Hedw. Brid. *Bryum* eorund. auctor. *Webera*, *Timmia*, *Pohlia*, Hedw. Brid. *Leskea*, *Hypnum*, *Anictangium?* Hedw. Op. posth.

Characters of the preceding genus: *lid* short, blunt, nearly flat; *urn* oval or inverted pear-shaped, furnished at its base internally with a fleshy substance, supporting the sac that contains the pollen and the capsule; tube arched and recurved at the top.

Species: *Mnium hornum*, *cuspidatum*, *undulatum*, *punctatum*, *annotinum*, *pyriforme*, *crudum*, Linn. *roseum*, *stellare*, *pseudo-triquetrum*, *pulchellum*, Hedw. *Bryum argenteum*, *cæspititium*, *capillare*, *carneum*, *turbinatum*, *dichotomum*, *Zierii*, *delicatulum*; *Pohlia elongata*; *Leskea cristata?*

cristata? Hypnum arcuatum? Anictangium planifolium? Webera nutans, longicolla? Timmia megapolitana, austriaca, Hedw.

Genus 32. AMBLYODUM (*αμϐλυς* obtusus and *οδους* dens), *Mnium, Bryum,* Dill. Linn. Juss. Lam. Gmel. Vent. *Meesia* Hedw. Brid.

Lid conical, short, obtuse; *teeth* 16, small, obtuse; *ciliæ* distinct, or united by transversal fibres, and as it were reticulated; *urn* oval, oblong, rather oblique and arched; *tube* long, straight; *perichætium* none.

Terrestrial plants. Stalks simple, or nearly so; leaves scattered; flowers terminal or semilateral.

OBS. This genus does not appear to me to be well settled; for, 1. are the obtuse teeth really such, or a simple fringe to the urn, as in Hymenopogum? 2. Should not the species with distinct ciliæ constitute a genus separate from those in which they are reticulated?

Genus 33. CYATHOPHORUM (*κυαθος* cyathus, and *φορεω* fero). *Anictangium* Hedw. Op. posth.

Veil cuculliform; *lid* conical, pointed; *teeth* sixteen, lanceolate; *ciliæ* united into a plaited membrane; *urn* oval, recurved; *tube* middle-sized, bowed, recurved at the top; *sheath* long, cylindrical, very open, cup-formed, persistent, surrounded by perichætial leaflets, that are subulate and like a herring-bone.

I have been in possession of this plant since the year 1784, when I received it from Mr. Dickson. Hedwig has not only mistaken its essential characters, but has named it *bulbosum,* from having seen only a single branch, to which was attached a portion of the creeping root. The specimen which I received from Mr. Dickson consists of two branches growing from the same creeping base, which is not at all bulbous.—A terrestrial plant with a creeping root, branches straight, furnished with two kinds of leaves, the one rounded, tiled on the stalks, the others oblong, two-ranked; flowers lateral.—One species only: *Cyathophorum pteridioides.*

Genus 34. HYPNUM Dill. Linn. Juss. Lam. Gmel. Vent. Hedw. Brid. *Leskea* Hedw. Brid.

Lid variable; *teeth* 16, lanceolate; *ciliæ* united into a plaited membrane more or less long, distinct at their extremity; *urn* straight or slightly inclined; *tube* of different sizes, straight; *sheath* oblong or tubercular, enveloped in the tiled leaves of the perichætium.

Terrestrial or aquatic plants, or growing on trees and stones. Stalks branchy; leaves scattered, seldom two-ranked, patent or tiled, straight or recurved; flowers lateral on the stalks or branches.

This numerous genus is susceptible of being divided, and that by more decisive characters than those adopted by Hedwig. It contains nearly two hundred species, viz. all the *Hypna* of Linnæus, except those referred to the foregoing or the following genera; the species of *Hypnum* and *Leskea* of Hedwig, with the same exception; and a great number of others not yet described or published.

b. *Ciliæ distinct.*

α. Veil hood-shaped.

Genus 35. NECKERA Hedw. Brid. *Hypnum* Dill. Linn. Juss. Lam. Gmel. Vent.

Lid conical or oblong, pointed, sometimes awl-shaped; *teeth* sixteen, lanceolate, of the length of the ciliæ; *ciliæ* distinct; *urn* oval, straight or drooping; *tube* straight, seldom recurved at the top; *sheath* oblong or tubercular, enveloped by a perichætium.

Plants growing on trees. Stalks branchy; leaves scattered;

tered; flowers lateral.—Species: *Hypnum viticulosum, curtipendulum*, Linn.; *Neckera cladorrhizans, seductrix, macropoda, crispa, pumila*, Hedw. Brid.

β. Veil bell-shaped.

Genus 36. PILOTRICHUM (πιλος pileus, ϑριξ, τριχος pilus). *Fontinalis, Sphagnum*, Dill. *Hypnum* Linn. Juss. Lam. Gmel. *Neckera* Vent. *Orthotrichum* Hedw. Brid.

Veil transparent, hispid with straight hairs; *lid* mammillary; *teeth* sixteen, lanceolate; *ciliæ* distinct, filiform, or like silken threads, alternating with the teeth; *urn* oval, generally covered by the perichætium; *sheath* short; perichætial leaflets often awl-shaped.

Plants growing on the stem and branches of trees. Stalks branched; leaves mostly imbricated, two-ranked; flowers lateral.—Species: *Fontinalis pennata, undulata*; *Sphagnum arboreum*; *Phascum repens*, Linn.; *Neckera disticha, patagonica, filicina, heterophylla, hypnoides, filiformis, composita; Hypnum polytrichoides, Smithii*, Hedw. Brid. and several others not yet described or published.

Genus 37. ORTHOTRICHUM Hedw. Brid. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Catharinea* Schrank.

Veil opaque, striated, often hispid; *lid* conical, pointed; *teeth* eight or sixteen, lanceolate, recurved; *ciliæ* eight or sixteen, silk-like, placed horizontally at the orifice of the urn; *urn* oval, straight; *tube* short, sometimes rather longer than the urn, straight; *perichætium* none.

Plants growing on trees. Stalks divided or branchy; leaves scattered, imbricated; flowers terminal or axillary.—Species: *Bryum crispum, striatum*, Linn.; *Orthotrichum affine, Octoblepharis, saxatile, obtusifolium, diaphanum*,

Hedw. Brid. and several fine species introduced by Messrs. Dupetit-Thouars and Bory-St.-Vincent, besides one which I found in the United States of North America.

SECTION V.

HYMENODES.—Orifice of the urn furnished with 32, 48, or 64 teeth, doubled back hookwise, immoveable, supporting a horizontal perforated membrane, supplying the place of an inner peristome.

Obs. The Hymenodes, both in habit, and the nature and disposition of their leaves, have the greatest affinity with the *Lycopodia*, with which family they naturally connect the mosses on the one hand, as *Andræea*, *Sphagnum*, and *Phascum* do with the Hepaticæ on the other.

Genus 38. Atrichum. *Bryum* Dill. Linn. Juss. Lam. Gmel. Vent. *Polytrichum* Hedw. Brid.

Veil cuculliform, beset at the top with some short and thinly scattered hairs; *lid* awl-shaped; *urn* oblong or oval, straight or slightly inclining; *tube*, long, straight; *sheath* oblong; *perichætium* none.

Terrestrial plants. Stalks simple or nearly so; leaves scattered; flowers terminal.—Species: *Bryum undulatum* Linn., *Polytrichum controversum* Brid., *hercynicum* Hedw. Brid.

Genus 39. Pogonatum. *Mnium* Linn. *Polytrichum* Dill. Linn. Juss. Lam. Gmel. Vent. Hedw. Brid.

Veil bell-shaped, double, the inner cleft on one side, the outer composed of interwoven threads; *urn* spheroid, or oval-oblong, simple or without apophysis; *lid* mammillary or conical, straight; *tube* long; *sheath* oblong; *perichætium* none.

Terrestrial plants. Stalks simple or divided, often scarcely any; leaves scattered, thick; flowers generally terminal.—Species: *Mnium polytrichoides*; *Polytrichum urnigerum* Linn., *convolutum, magellanicum, Oederi, formosum, pulverulentum, aloides, pennsylvanicum, minutum*, Hedw. Brid.

Genus 40. POLYTRICHUM Dill. Linn. Juss. Gmel. Vent. Hedw. Brid.

Veil similar to that of the preceding genus; *lid* mammillary; *urn* generally quadrangular, having a swelling or apophysis at the base, inclined horizontally; *tube* long, straight; internal envelope quadrangular, four-celled; *capsule* fusiform, hispid; *stigma* four- or five-cleft; *sheath* oblong, covered by the membranous and sheathing leaflets of the perichætium.

Terrestrial plants. Stalks simple or nearly simple; leaves thick, sheathing, scattered; flowers terminal or axillary.—Species: *Polytrichum commune, juniperinum, piliferum, alpinum*, Linn., *glabrum* Brid., *dendroides* Hedw. Brid. and several others not yet published.

XVI. *Continuation of Ætheogamia, by* THE SAME.

THE LYCOPODIA.

THE Lycopodia in the writings of botanists have hitherto formed only one genus, which has been placed by some among the Mosses (Linnæus), by others in a not very natural tribe, the Miscellaneæ (Schreber), and again by others among the Ferns (Swartz, Bernhardi). M. de Jussieu, in his work on the natural orders, has likewise arranged them with the mosses: but this great botanist was well aware that they ought to be separated from them; for which reason he calls them *spurious mosses*. Indeed these plants, if examined with more attention than has been hitherto done, present striking characters by which they may be distinguished from the Mosses and Ferns, to neither of which they can belong; but they, in fact, constitute a very natural intermediate family.

The Lycopodia grow in the same manner as the Mosses, of which they have in some measure the habit and external appearance: in both, the leaves are sessile, simple, entire, ciliated or toothed, scattered or two-ranked, and more or less tiled; but they nevertheless differ so very essentially, that they can by no means be arranged in the same natural order.

The flower of the Lycopodia is of two kinds, very different and separate: it is not furnished either with veil or lid, characters peculiar to the Mosses: it has no teeth, ciliæ, &c. but is altogether different, and has an appropriate structure. For although in its external form it has considerable resemblance to the parts of fructification of some Ferns, yet the difference in detail is very great; not to mention the manner of growth entirely peculiar to the latter vegetables. For this reason I consider as erroneous the distribution adopted by some botanists, who connect the Lycopodia with such Ferns as have capsules without an elastic ring; for, if the latter do not belong to the natural order of the Ferns, it appears more proper to let them constitute a separate order, than to unite them with that of the Lycopodia, of which they have not all the characters.

The Lycopodia, as has been already observed, have two flowers so very different as to leave no doubt respecting their nature. The male organ is a small body, generally reniform, oval, or three-lobed, sessile or naked, placed in the axils of the leaves, or beneath bractes that form a distinct spike. This minute body, justly compared to an anther, is unilocular, two- or three-valved, filled with a very fine inflammable powder immiscible with water, the grains of which are spherical, smooth, or rough. This powder, which is incontestably the pollen of the Lycopodia, has the same form, is of the same nature, and in every respect resembles the dust contained in the urn of the Mosses, in the cross-shaped florets of the Jungermanniæ, in those of Marchantia, of Anthoceros, and even that with which some mushrooms are filled, such as the Lycoperdons*, Lycogala, Trichia, &c., in all of which it may be presumed to perform the same function.

The female organ has not been discovered in all the genera of the natural order of the Lycopodia, but is so very apparent in some, that we cannot doubt of its existence, though under different forms, in all. It is a capsule of one, two, or three valves, one-celled, one- or many-seeded, naked, or surrounded by bractes peculiar to it ;—either on the same spike with the male flowers, (sometimes mixed with them, at other times below them at the base of the spike,) or separate from them in the axils of the branches ; or, lastly, on different spikes. This capsule contains one or several spherical seeds, filled with a gelatinous substance, in which no embryo has as yet been discovered.

The Lycopodia are terrestrial plants, and mostly found in woods and shady places. This natural order consists of seven genera, very distinct as far as relates to the disposition of the male flowers, which only are determined in all of them. It is the discovery of the female organs that must decide whether these genera are all really natural ; and as the three genera in which that organ has been demonstrated have the male flowers differently disposed, relative to the female, it may safely be presumed that the same must take place in the other genera, and that these are likewise natural ones. Besides this, the genera are founded on analogies and probabilities, the more important as they render the study of the Lycopodia more simple and easy.

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* It is to be remarked that most of the Lycoperdons contain, in the centre of their substance, a considerable quantity of powder, which seems to be analogous to that above alluded to ; but besides this there is another collection of powder, more subtile still, below, and surrounding the former, from which it is separated by a membranous dissepiment, corresponding to the opening that appears when the mushroom is arrived at maturity.

Linnæus and Jussieu have placed near to the Lycopodia the genus *Porella*; but the younger Linnæus has doubted its existence as a separate genus, suspecting its near affinity to, if it be not a real congener of, Jungermannia. Having myself most scrupulously examined Porella in the United States of America, where it grows abundantly, I never found more than one kind of fructification, which appeared analogous to, and very like what is considered by me as, the female flower of Jungermannia; whence we may conclude, that if Porella be not a species of that genus, it cannot at least be removed from the order of the Hepaticæ, to which it shows an affinity not only in its flowers, but also in its substance, the nature and disposition of its leaves, and in its whole habit.

Genus 1. PLANANTHUS. *Lycopodium* Dill. Linn. Juss. Lam. Gmel. Vent. *Lycopodioides*, *Selago*, Dill. (πλανος vagus, and ανθος flos.)

Monoicous.

Male flowers sessile, kidney-shaped, two-valved, scattered along the stalks in the axils of the leaves, where sometimes they form a small protuberance, but never a distinct spike.

Female flowers not yet known. Botanists have considered as such the small bunches of leaves observed and figured by Dillenius; but these parts deserve to be reexamined with attention.

Stalks upright or trailing, dichotomous or more branched; branches simple or divided; leaves scattered, seldom two-ranked.—The species of this genus are *Lycopodium Selago* Linn.

Linn, *Saururus* Lam., *patens* P. B. Dill. t. 56. f. 1. ε. *Plananthus reflexus* P. B. Dill. t. 56. f. 2. *Plan. angustifolius* P. B. Dill. t. 56. f. 3. *Lycopod. alopecuroides, inundatum*, Linn.; *gnidioides, taxifolium, squarrosum, dichotomum*, Gmel.; *linifolium* Linn.; *serratum, rigidum*, Gmel., *denticulatum?*

I have referred to this genus the *Lycopodium denticulatum* Linn., the only species with two-ranked leaves, and which, after more minute examination, may perhaps be found to belong to another genus, or to constitute one of itself.

Genus 2. SELAGINELLA. *Lycopodium* Linn. Juss. Lam. Gmel. Vent. *Selaginoides* Dill.

Monoicous.

Male flowers sessile, kidney-shaped, two-valved, mixed with the female flowers at the extremity of the branches, where they form a spike-like protuberance.

Female flowers sessile; *capsules* one-valved, valves trilobed, many-seeded (3—4); *seeds* round, smooth.

Stalks creeping; branches straight; leaves scattered, serrulated, almost spinous.

Only one species is known of this genus: *Lycopodium Selaginoides* Linn.

Genus 3. LEPIDOTIS. *Lycopodium* Dill. Linn. Juss. Lam. Gmel. Vent. *Lycopodioides* Dill.

Male flowers kidney-shaped, sessile, two-valved, scattered in distinct and terminal spikes, covered by yellowish bractes different from the leaves.

Female flowers not yet determined.

Stalks depressed, creeping or climbing, simple, dichotomous or branched; leaves scattered; spikes sessile or peduncled, simple or in pairs; bractes lanceolate, oval, pointed, often serrulated.

This genus is composed of ten species, which I divide into four sections.

Section 1. Spikes sessilé, simple:—*Lycopodium obscurum, annotinum, cernuum,* Linn., and *Lepidotis convoluta:* caule repente surculis rectis ramosis, foliis sparsis decurrentibus oblongo-lanceolatis convoluto-plicatis, spicis terminalibus. P. B. Hab. in Indiis.

Section 2. Spikes sessile, divided:—*Lycopodium Phlegmaria* Linn.

Section 3. Spikes peduncled, simple:—*Lycopodium carolinianum* Lam., and *Lepidotis magellanica:* caule repente surculis ramosis suberectis, foliis lineari-lanceolatis acutis imbricatis sparsis, spicis terminalibus, bracteis lanceolatis acutis margine membranaceis undulatis. *P. B.*—This species has been communicated to me by M. de Jussieu.

Section 4. Spikes peduncled, double or in pairs:—*Lycopodium clavatum, complanatum,* Linn.; *Lepidotis triquetra* P. B. Dill. tab. 58. fig. 2.

Genus 4. GYMNOGYNUM (γυμνος nudus, and γυνη fœmina.)

Monoicous.

Male flowers kidney-shaped, two-valved, sessile, scattered under herbaceous bractes, united into a terminal, angulated, and sessile spike.

Female flowers solitary at the divisions of the branches; *capsule* naked, spherical, two-valved, opening vertically, one-seeded; *seed* spherical.

This genus consists of one species only, which I found at St. Domingo, along a torrent bed in going from the neighbourhood of the great river to Attalaye. I presented it in 1789 to the Society of Sciences and Arts at the Cape, with this description: *Gymnogynum domingense,* caule repente, surculis erectis, foliis bigenis,

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genis*, aliis distichis ovato-oblongis, aliis minimis supra caulem et surculos stricte imbricatis.

Genus 5. DIPLOSTACHYUM (διπλους duplex, and σταχυς spica). *Lycopodium* Linn. Juss. Lam. Gmel. Vent. *Lycopodioides* Dill.

Monoicous.

Male flowers sessile, two-valved, kidney-shaped, beneath herbaceous bractes resembling leaves, imbricated, scattered, and forming a very short terminal and sessile spike, distinct from that of the female flowers.

Female flowers terminal, sessile, disposed in a very short spike, resembling that of the male flowers, but distinct on the same stalk. *Capsules* tricoccous, three-valved, three-seeded; *seeds* spherical, white, rough.

Stalks trailing; branches erect and divided; leaves two-ranked.—This genus comprises four species, viz. *Lycopodium helveticum*, *apodum*, *radicans*, Linn., and *Diplostachyum tenellum* P. B.: caule repente ramoso, ramis erectis divisis, foliis bigenis, aliis distichis oblongo-lanceolatis subobtusis margine ciliato-dentatis, aliis minoribus supra caules stricte imbricatis apice acuminatis, acumine longo spinoso dentato.

Genus 6. STACHYGYNANDRUM. Flore d'Oware et de Benin, Pl. vii. (σταχυς spica, γυνη fœmina, and ανηρ vir, masculus.) *Lycopodium* Linn. Juss. Lam. Gmel. Vent. Dill.

Spike monoicous.

Male flowers sessile, kidney-shaped, two-valved, scattered under herbaceous bractes, smaller than the leaves, and covering a four-cornered spike.

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* I have not seen this word employed by any botanist; but finding it difficult to express in a single word leaves of two kinds, I have thought it right to frame one. The antient authors, Pliny among others, have made use of the term *multigenus, a, um*, for *multigeneris*, of many kinds; whence I have deemed it not improper to use *bigenus*, to express something of two sorts.

Female flowers solitary at the base of each spike, with five or six oblong bractes, longer than those of the male flowers; *capsule* three-valved, one-celled, generally three-seeded; *valves* blunt, concave; *seeds* spherical, white, chagrined.

Stalks creeping, trailing, or climbing; branches upright, pinnatifid; leaves two-ranked.

This genus comprehends sixteen species, several of which however, as having not yet been observed in perfect fructification, may perhaps belong to some of the preceding genera:—*Lycopodium rupestre, alpinum, flabellatum, canaliculatum, circinale, verticillatum, sanguinolentum,* Linn., *ciliate, myrtifolium, japonicum,* Gmel.—*Stachygynandrum amplexifolium:* foliis distiche imbricatis amplexicaulibus P. B.—*falcatum* P. B. Dill. tab. 66. f. 9.—*obliquum* P. B. Dill. tab. 66. f. 8.—*S. tamariscinum:* surculis erectis ramosis complanatis, foliis stricte imbricatis distichis subtus concavis P. B.—*scandens* P. B. Fl. d' Ow. et de Ben. pl. vii.

Genus 7. Psilotum Swartz. *Lycopodium* Linn. Juss. Lam. Gmel. Vent. *Lycopodioides* Dill.

Male flowers solitary along the stalks, sessile, axillary, tricoccous, three-valved, one-celled.

Female flowers not yet observed.

Stalks almost woody, erect, branchy, destitute of leaves, in lieu of which they have small excrescences like fish-bones.

This genus is composed of two species: *Lycopodium nudum* Linn. and *Psilotum floridanum* Mich. Fl. Amer. Bor. The latter may, however, turn out to be a variety only of the former.

Psilotum has of all the Lycopodia the greatest affinity to the Ferns, and may be considered as a connecting link between the two families.

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XVII. *Observations on Pistia Stratiotes of* LINNÆUS, *abridged from the Spanish*[*] *of Don* LUIS NEE.

PISTIA is one among the many plants recommended by Linnæus to ulterior investigation. He could himself only see a few dried flowers, in a state unfit for examination; and Rumpf and others were so far from throwing light upon its fructification, that they even doubted its being propagated by means of seeds. Jacquin has examined this plant with his accustomed accuracy, and given a very good figure of it, together with a description, which however, owing to his not having seen the fruit, and to the want of an opportunity of repeating his observations, is not very complete[†]. For this reason, it seems to me not altogether superfluous to offer my own observations on the fructification of this plant, and the mode in which it is propagated.

I saw the Pistia for the first time in the month of May 1790, at Callao near Lima, in a spring called Aguada, as also in the stagnant waters close to the fort St. Carlos. In October of the same year I found it in abundance in the rivers Filca and Caluma, on the way from Guayaquil to Quito, either floating or rooted on the banks. In February of the following year I had an opportunity of observing this plant on my journey to the Rio Grande, in the wet places of Acapulco, and in June and July in the canals of Mexico. Lastly, in 1792, I met with it in great profusion in the Philippine Islands, the Laguna de Bahi, and the island of Mindanao.

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[*] Anales de Ciencias Naturales, no. 13, p. 76.

[†] Though M. Nee's description is far from being complete and satisfactory, yet there being some observations in the above account not unworthy the notice of botanists, we may consider it as a useful contribution towards the knowledge of Pistia. We add here an interesting remark made by Labillardière (Voy. à la Recherche de la Perouse, tom. 2. p. 328.) respecting a property of that plant:—The swampy places of Anké were quite covered with different water plants, and especially Pistia, which latter in great measure absorbs the deleterious miasmata as they rise from the mire to convert them into respirable air, and so powerfully counteracts the decomposition of the stagnant water, that fishes kept in a small quantity where they would perish in a few days, live a long time in it, if its surface be covered with this singular plant.—TRANSL.

The Pistia is not confined to the surface of waters, as has been erroneously stated by Rumpf and other botanical writers. Adanson found, in the Senegal, that its primary root was fixed in the earth; but Jacquin, without opposing that assertion, says that in taking the plant out of the water, he did not perceive the least resistance which could indicate a connexion of the roots with the soil at the bottom of the water.

According to my own observations, the seeds of the Pistia will germinate extremely well in wet ground, which is soon covered with such a prodigious quantity of plants, that the traveller may fancy he sees a vast field of lettuce before him. So I found it in the neighbourhood of Acapulco, and in the Laguna de Bahi. When afterwards the floods had disengaged their roots from the ground, they swam about, with most of their leaves contracted inwards into the shape of little boats. All this proves that this plant is really amphibious, and that wet ground is a proper station for its growth.

As soon as they have exchanged the land for the water they produce many additional roots, of a white colour, some of them short and thick, others a foot and a half in length, which serve both for ballast and as organs of nutrition. From these grow bundles of diverging lateral fibres, giving the appearance of an Equisetum or Hippuris, as is well represented by Jacquin in tab. 225 of his Coloured Plants of America. From the upper end of each bundle of roots issue about twenty leaves without footstalks, closed and erect towards the base, and rather expanded upwards; the whole not unlike an opened lettuce. The full grown ones are almost a foot in diameter, the young ones considerably less.

The leaves are obovate, wedge-shaped, scariose, concave, and tomentose towards the base; rolled back, obtuse, sometimes emarginate, and (especially the central ones) pubescent at the upper part; rather waved at the margin; spongy; colour a yellowish green, except at the backs of the outer ones, where it is generally pale rose. Their lower surface is marked with seven or more prominent ribs, that run towards the top in almost a parallel direction.

Flowers solitary from the centre and base of the leaves, of a whitish colour, about two inches in length, including the short peduncle, tomentose, and ciliated at the margin, covered before expansion by a transparent deciduous membrane. They are almost scentless.

Calyx none. Corolla one-petalled, hood-shaped, split down to the base, where it is rolled up into a tube which surrounds the ovary; attached to it are two orbicular, rather concave, green appendages, the one where the tube becomes narrower, the other rather lower and opposite.

Filament solitary, thick, short, inserted into the upper appendage of the corolla, terminated by six distinct globular two-celled anthers.

Ovary pear-shaped, lineated, inclosed within the folded tube of the corolla. Style scarcely any. Stigma blunt.

Fruit an oblong capsule, swelled towards the base, one-celled, opening horizontally as in Anagallis. Seeds many, their receptacle attached to the bottom of the capsule, cylindrical, thickened at one of their sides, and resembling a pestle in miniature.

From this it appears, that the proper place which Pistia should occupy in the Linnean system, is the class Monadelphia. According to Jacquin, the number of the anthers is inconstant, he having observed also seven and eight, but more frequently six, as I found in all those I examined: this seems, therefore, to be the most usual number.

The Pistia is called *Chiapo* or *Sjiapo* in the Philippine islands; *Kodda-Pail* and *Aucashdammaree* in other parts of the East Indies. Its synonymy is as follows:

Pistia Stratiotes *Linn. Sp. Pl. vol.* 4. *p.* 64. *Jacq. Stirp. Amer. p.* 113. *tab.* 225. *Burmann Flora Ind. p.* 191.

Pistia planta natans, facie plantaginis, foliis subrotundis, omnibus radicalibus, hirsutis, rosæ in modum patentibus, absque flore. *Loefl. Iter. p.* 281.

Pistia aquatica villosa, foliis obovatis, ab imo venosis, floribus sparsis foliis insidentibus. *Broun Jam.* 329.

Kodda-Pail *Rheede Hort. Malab. vol.* 2. *p.* 63. *tab.* 32.

Kodda-Pail palustris, folio oblongo spongioso. *Plumier Gen.* 30.

Plantago aquatica *Rumpf. Amb. vol.* 6. *p.* 177. *tab.* 74.

Nymphæa indica latioribus albicantibus foliis, margine crispatis. *Pluken. Mant. p.* 137.

Lenticula palustris vi. vel ægyptiaca, sive Stratiotes aquatica, foliis sedo latioribus. *C. B.—Sloane Jam. Hist.* 1. *p.* 15. *tab.* 2. *fig.* 2. *pessima.*

Stratiotes Hayh-alem-elmaovi *Prosp. Alp. Ægypt. p.* 108, 109.

Rheede mentions some virtues which this plant is said to possess, but I have not seen it applied to any medicinal use whatever. In Acapulco I observed that the hogs were fond of it, and the hens picked it to pieces for feeding their chickens. The natives near the Laguna de Bahi clean and boil the plants before they give them to their hogs, and are said to feed on them occasionally themselves. How far this be true I cannot say; what I know for certain is, that the handling them causes itching, and that, on account of this acrid alkaline nature, they are made use of as a substitute for soap by the women of the Philippine islands.

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XVIII. *Second Memoir on the general Characters of Families of Plants, derived from the Seeds, as confirmed or corrected by the Observations of Gærtner.* By A. L. de Jussieu *.

In a former memoir † on the application of the labours of Gærtner to the illustration of the natural affinities of vegetables, I collected together the scattered observations of this author, appertaining to the genera of the dicotyledonous, apetalous, hermaphrodite families of plants, and endeavoured to apply them to confirm or correct the general characters, derived from the seeds, in these families. My present labour is a continuation of the foregoing, and will present the same approximations for the families of the monopetalous plants. This grand division of the Dicotyledones may be naturally subdivided into four classes, distinguished by the insertion of the corolla, whether hypogynous, perigynous, or epigynous with connected anthers, or, finally, epigynous with distinct anthers. We shall go over these classes in their order.

The class of hypogynous plants, or such as have their corolla inserted below the pistil, contains fifteen families, which, with two new ones, shall be considered in the order in which we presented them in 1789.

I had not observed the embryo in any one plant of the *Lysimachiæ*; accordingly no mention was made of its structure in the general character of this natural family. Gærtner has examined the seeds of Centunculus, Anagallis, Lysimachia, Limosella, Trientalis, Androsace, Primula, Cortusa, and Dodecatheon, belonging to the same family, and found in all of them a cylindrical straight embryo, with a radicle nearly equal to the lobes, inclosed in a fleshy perisperm.

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* Annales du Muséum d'Histoire naturelle, vol. v. p. 246.

† See p. 144 of this volume of the Annals of Botany.

sperm. The seeds are numerous, affixed to a central unconnected receptacle; and their minuteness probably prevented Gærtner from determining with precision the direction of the radicle, which he states as being in some descendent, in others turned to one side of the centre, and in some again to the contrary side. These expressions are perhaps rather vague, and the character of having the radicle turned towards the umbilicus of the seed, or its point of attachment, would probably be more accurate; which being added to that of the structure of the embryo, and the presence of a perisperm, will afford a general character, which should not in future be omitted in the description of this family. Gærtner's Euparea should be brought here, which resembles the above genera both in habit and fructification, differing chiefly from them in having, according to this author, a polypetalous corolla, but which is perhaps only deeply divided.

Samolus has, according to Gærtner, precisely the same character, which removes it further from the Portulaceæ which are furnished with an embryo applied to the lateral surface of a central substance. And notwithstanding this genus has a calyx adherent with the base of the ovary, a circumstance not observed in any other of the same class, it nevertheless has more affinity with the Lysimachiæ than with any other family, both in the character of its embryo and the situation of its seeds in the capsule. But Globularia has not the same affinity, being distinguished from this family not only by its solitary naked seed, but also by the large spreading lobes of its embryo, and by its radicle, short and ascendent, that is to say, directed towards the side opposite to the point of attachment. Gærtner, who observed this embryo, attributes to it a fleshy perisperm; but as he admits but of one membranous integument, may it not be presumed that he took the inner membrane, somewhat thickened, for a perisperm, which would in that case be wanting in this genus? If this explanation be allowed, Globularia would then have more affinity with the Thymeleæ or Daphnoides, which have also only one seed, and a similar embryo, but differ from Globularia in being without a corolla. This last circumstance opposes a perfect affinity; and Globularia must therefore still remain among the genera to which it is difficult to assign the proper place in a natural arrangement.

Two other genera which follow the Lysimachiæ have like them a one-celled capsule, and a central receptacle of the seeds: these are Utricularia and Pinguicula; but they have an irregular corolla, and only two stamens, like Calceolaria, referred to the Scrophulariæ. Gærtner, who has examined Pinguicula, found an embryo like that of the Lysimachiæ, but without a perisperm, or with only a very small one. It may be presumed that Utricularia, which approaches so near to Pinguicula in other respects, has the same organization. The absence of a perisperm would remove these two genera from both the just mentioned families, which are provided with one. It would be desirable to repeat the examination, in order to ascertain this organization, which must determine the affinity of these plants.

The last genus brought near to the Lysimachiæ, the Menyanthes of Linnæus, is one of those that merit a particular attention and a real reform: it is composed of two genera of Tournefort, viz. his Menyanthes and Nymphoides, which appear to have different characters; for, without mentioning the corolla, which is not the same in both, the fruit, according to Gærtner, opening with two valves, shows the seeds attached to the margin of the valves in Nymphoides, and to their middle in Menyanthes: both, however, have a cylindrical embryo, placed in the centre of a fleshy perisperm. Upon the whole it may be concluded, that these two genera should be separated; that neither can remain attached to the Lysimachiæ, because they have not a central receptacle; that the insertion of the seeds into the margins of the valves ought to bring the Nymphoides to the Gentianæ, to which it has been already united by Adanson and Ventenat; that Menyanthes ought to be removed from this family on account of its seeds being attached to the middle of the valves, by which it approaches nearer to Orobanche and other analogous plants; that it differs from these, however, in its general habit, and in having a regular corolla; and, finally, that it will be more difficult to ascertain its affinities, unless some of the real Gentianæ should be found to have a similar insertion of the seeds, as has been already hinted by Ventenat.

The *Pediculares*, or *Rhinanthi*, constituting the next family, include three sections, of which the second is that of the Rhinanthi properly so called, which take their name from having the limb of the corolla irregular, in shape of a muzzle or mouth, as in the Rhinanthus or Cock's-comb, one of the principal genera in the series. This section shows in all the seeds a fleshy perisperm: but if the observations of Gærtner be correct, the genera composing it afford a very striking contradiction; for he says that in Melampyrum, Pedicularis, and Rhinanthus, the embryo is very minute, situated in a cavity of the perisperm at the end the furthest from the umbilicus, and has an ascendent radicle; whilst in Euphrasia, Buchnera, Erinus, and Manulea, he finds an embryo longer, cylindrical, lodged in the centre of the perisperm, with its radicle directed towards the umbilicus. As these genera have very great affinity with respect to their other characters, it is difficult to admit this difference, and one is tempted to believe, that the author, having examined the seeds, which are very minute, out of their cells, has been deceived in regard to the direction of the radicle in the three former genera. At the same time some of the first section afford, according to him, the same difference; for the embryo of Veronica is situated like that of Melampyrum, whilst in Sibthorpia it is placed as in Euphrasia. It is not possible, therefore, to draw from the seed of these two genera any character which can distinguish them sufficiently from the true Rhinanthi, and we are obliged to have recourse to other parts to determine their affinities.

Polygala, placed in the same section, has a still more singular character, which has not escaped the observation of Gærtner, and appears to have been seen by Adanson before him. The umbilicus of its seed is furnished with a glandular tubercle, in the form of a calyx with three unequal lobes; the embryo, surrounded by a fleshy perisperm, has broad lobes with a much smaller straight radicle, directed toward the umbilicus. As nearly a similar tubercle exists in the Euphorbiæ, Adanson had referred to this family the Polygala, which has also a single seed in each cell attached to the top of the partition; and Gærtner has adopted this opinion: but this genus has not the central axis of the capsule which exists in the Euphorbiæ, nor does its capsule open with elasticity, and its flower has an organization altogether different. It may be concluded, however, from this observation, that Polygala does not belong to the Pediculares; and that, if the aforesaid tubercle be an arillus, as M. Richard says in his Dictionary of Botany, p. 7, and it be true, as he also says, that the seeds of monopetalous plants are never furnished with an arillus, this genus must be removed from the families of monopetalous plants, and added to the polypetalous, regarding the part of the corolla which is split on one side its whole length, as a separate petal. Several characters separate this genus from the Leguminosæ, to which Linnæus had referred it in his system on account of its diadelphous stamens. It may have more affinity, from its arillus, with

Diosma, placed at the end of the Rutaceæ; from which it differs, however, by its irregular flower, the insertion of its stamens upon the petal, and its two-celled fruit: perhaps it will be best to place it near to this genus for the present, either as an accessory or as constituting a new family.

In the third section of the Rhinanthi, which only approaches this family without really belonging to it, we find, according to Gærtner, the embryo of Lathræa, in a very small lateral cavity of a fleshy perisperm filling the seed. From the near affinity between this genus and Orobanche, we may presume that the latter also has the same organization; and as these plants differ besides from the Rhinanthi in having a one-celled capsule, and the receptacle of the seeds attached to the middle of the valves, they should be formed into a distinct family, under the name of *Orobanchoïdes* or *Orobancheæ*, as has been done by Ventenat; and in the general character of this family the situation of the embryo ought not to be omitted.

The family of *Acanthi* or *Acanthaceæ*, which is very natural, does not present the same differences in the organization of the seeds. As observed by Gærtner in Acanthus, Barleria, Ruellia, Justicia, and Dianthera, the seed has no perisperm, the lobes of the embryo are large, and fill the interior of the seed; the radicle is always directed to the umbilicus, but is straight in Acanthus and Ruellia, a little inclined upon the lobes in Barleria, longer and more curved in Justicia and Dianthera, which several authors unite into one genus. To determine what stress ought to be laid upon this length and curvature of the radicle in these last, it should be ascertained whether this character always exists in those genera that have but two stamens, and is wanting in such as have four. For the present, it will be sufficient to add to the character of this family an embryo without

perisperm,

perisperm, and a radicle descendent, or directed towards the umbilicus.

The family of *Jasmineæ*, as it is characterized, offers in the regularity of the corolla, and the number of stamens, a remarkable conformity in all the genera, with the exception of some apetalous species of ash. The fruit, which is capsular in some and fleshy in others, makes two principal divisions, of which M. Ventenat has since formed two families: it is not, however, certain that this character is sufficient to establish such a distinction; the seed may afford more striking differences. In consulting Gærtner we find, as well in Olea, Phillyrea and Ligustrum, in which the fruit is a berry, as in Lilac and Fraxinus, both capsular, the seeds attached to the top of the cell, a straight embryo with a short ascending radicle, and large lobes, broad and thin, in the centre of a fleshy perisperm. I have observed the same character in Chionanthus virginica; but, according to Gærtner, there is no perisperm in Chionanthus zeylanica and Jasminum fruticans, and I have not found any in Jasminum humile; which will not allow me to doubt of the truth of the last-mentioned observation of this author. We may add from Gærtner, that the radicle, always directed to the point of attachment, is ascendent in Chionanthus zeylanica, descendent in Jasminum fruticans, in the seed of a plant which he hesitatingly calls Nyctanthes Sambac, but which is rather a Mogorium, and in the true Nyctanthes, which he has given under the name of Parilium; that the embryo of this Parilium is, like that of the Jasmineæ, sufficiently large and covered with a perisperm; but that the embryo of his Nyctanthes is, on the contrary, very small, and placed in a cavity in the perisperm, near the umbilicus. This author speaks also of an arillus enveloping the seeds of his Nyctanthes; but may we not conclude from these three characters, strangers to the Jasmineæ, that this plant does not belong to the same family, and is neither a Nyctanthes nor a Mogorium, nor even a monopetalous plant? As to the contradictions resulting from the seeds being with or without a perisperm, and from the radicle being ascendent or descendent, these occasion an indecision in proposing the character of the embryo in the Jasmineæ, and influence the manner of appreciating the value of the perisperm in general. If, however, it is observed that the perisperm, which seems to be wanting in some seeds, is sometimes supplied by a fleshy lamina, which lines their internal membrane, and that the different direction of the radicle is only a consequence of the different insertion of the seeds to the top or to the bottom of the cells, these contradictions will be less striking, and this character of the seed will be the more deserving of particular attention. It is probable that this family, if subjected to a fresh examination, will undergo some reform, as well in its internal construction as in the relations it bears to other families, and that its regular corolla will bring it nearer to those which have this character.

We shall find less difficulty in the examination of the *Vitices* or *Verbenaceæ*. Bernard de Jussieu had observed an embryo without perisperm and a descendent radicle in Lantana and Verbena mexicana L., which is now made a distinct genus, variously named by different authors. His observations are confirmed by those of Gærtner, who found the same characters in Volkameria, Ovieda, Vitex, Premna, Gmelina, Theka, Petræa, Citharexylum, Duranta, Lippia americana, and Verbena. He has observed in the seed of Hebenstreitia the internal membrane a little fleshy; in Callicarpa he admits a very thin perisperm, which, judging by analogy, should appear to be only a thickened membrane; both, however, have the same direction of the radicle. We may then without exception establish for the Verbenaceæ the characters of a straight embryo without

perisperm,

perisperm, and a descending radicle: consequently Selago fasciculata and Lippia ovata should be removed from this series, if it be true that they have, as Gærtner says, an ascending radicle and a fleshy perisperm. This observation may however be doubted, considering the other affinities of these plants with the family.

In the *Labiatæ* I had remarked a seed similar to that of the Vitices or Verbenaceæ; and Gærtner has confirmed this observation in Amethystea, Ziziphora, Monarda, Salvia, Collinsonia, Lavandula, Phlomis, Molucella, Dracocephalum, Cleonia, and Prasium.

In extending these observations to the seeds of Capraria, Scoparia, Stemodia, Scrophularia, Dodartia, Antirrhinum, Linaria, Digitalis, Calceolaria, Gratiola, Mimulus, Schwalbea and Browallia, all belonging to the *Scrophulariæ*, we find in general in this family a small cylindrical, short-lobed embryo, with a long radicle directed towards the centre, that is, to the central receptacle to which the seeds are attached. The radicle has an opposite direction in Besleria, in which the receptacle is fixed to the sides of the capsule. This parietal insertion will give rise to a new family, already proposed by some botanists. Buddlea, which is removed from the Scrophulariæ by some of its characters, differs also in having the lobes of the embryo flattened, broader and larger than the radicle, which is likewise directed towards a central receptacle. The same character exists in Cymbaria; but this is distinguished both from Buddlea and from the Scrophulariæ by the dissepiment of the capsule being opposed to the valves. The same takes place in Mimulus and Stemodia; and these two genera, and others which have a similar organization, ought perhaps to be arranged with the Pediculares. The examination of the capsule in the other genera may lead to several other reforms, when this part comes to be considered with regard to natural affinity. Above all, Polypremum must be joined with the Rubiaceæ, if it be true, as Michaux and Richard affirm, that its calyx adheres to the lower part of the ovary: in the structure of its embryo, enclosed within a fleshy perisperm, it approaches equally to both families.

The *Solaneæ* have affinity with the foregoing, especially with respect to their capsular genera, which have the same organization of the seeds, and only differ in the stamens being equal in number to the divisions of the corolla. All of them have, according to Gærtner, a fleshy perisperm, not farinaceous, in which the embryo is concealed with its radicle directed towards the umbilicus of the seed. He found this part straight and cylindrical in Celsia and Verbascum, as it is in the Scrophulariæ; a little curved in Nicotiana; bent into a hook, and always cylindrical, in Hyoscyamus, Datura, Mandragora, Atropa, Nicandra, Physalis, Solanum, Capsicum, Lycium, and in Nolana, necessarily joined with this family: so that the two first genera, both by their capsule and by their straight embryo, form a gradual transition from the preceding family to this, of which a curved embryo will be the most general character. The embryo of Cestrum nocturnum examined by the same author, and before by Bernard de Jussieu, affords a remarkable deviation: its lobes are orbicular, broad and thin, its radicle narrower, longer, cylindrical, and nearly straight. This character would seem to remove it a little from the Solaneæ, although it has like them a fleshy perisperm; but other affinities will not allow of its separation, and the embryo of its congeners should be likewise examined.

In the *Borragineæ* the embryo is mentioned as being without perisperm. So Gærtner found it in Cerinthe, Echium, Lithospermum, Onosma, Symphytum, Lycopsis, Myosotis, Anchusa, Borrago, and Cynoglossum; he observed also in all of them an ascending radicle. Both these characters he found also in Cordia Myxa L., which he calls

Sebestena; but besides these a very thin lamina, lining the internal membrane of the seed, and the lobes of the embryo very much folded. When he announces a thin perisperm surrounding an embryo, straight in Messerschmidia and Coldenia, and curved in Tournefortia, it seems more natural to believe that this perisperm is only a fleshy lamina, of which he found traces also in his Sebestena; and then the general character will be the same in the whole family, except only the curvature of the embryo observed in Tournefortia, and the corrugated lobes in Sebestena, which establish a relationship with the following family. Four genera at first united to this family ought now to be separated from it: 1. It is acknowledged that Siphonanthus is the same plant as Ovieda mitis, and consequently belongs to the Verbenaceæ. 2. Nolana, notwithstanding its five cells, should be arranged with the Solaneæ, which it resembles in habit and foliage, and moreover, according to Gærtner, in its hooked embryo situate in a fleshy perisperm. 3. Hydrophyllum has a cartilaginous perisperm, filling the seed, and containing a very minute cylindrical embryo in a cavity, near the umbilicus, towards which the radicle, longer than the lobes, is directed. If this character be true, Hydrophyllum cannot remain with the Borragineæ, from which it differs too in some other respects. By means of its embryo it may be said to have some affinity with Veronica and several Rhinanthi, or with Myrsine, of which we shall treat hereafter; but this affinity does not appear to exist in the other parts of its fructification. 4. Gærtner has seen in Steripha (Dichondra of Forster) an embryo in every respect conformable with that of the following family, to which this genus should be referred, especially as it also resembles it in other characters.

The embryo of the true *Convolvulaceæ* has a descending radicle and broad lobes, irregularly folded: it is surrounded by a substance of a particular nature, which holds the place of a perisperm, and penetrates between the lobes. This substance is but little perceptible in a perfectly ripe seed, and almost disappears in drying; which occasioned me to doubt its existence; but if the seed be soaked in water, this perisperm swells, softens, and dissolves into a mucilage. These characters, which appear in the Malvaceæ, classed with the polypetalous plants, have been observed by Gærtner in Convolvulus, Ipomæa, and Dichondra. I have seen almost the same structure in Cressa, except that in this the lobes of the embryo are long and narrow like the radicle, against which they are folded without any irregularity.

Other genera, arranged with these in a separate section, differ in having a small straight embryo with lobes not folded, equal in length to the radicle. So Gærtner observed it in Nama jamaicensis, to which he attributes a fleshy perisperm, and in Hydrolea, which instead of perisperm has only a fleshy lamina upon the surface of its internal membrane. Gærtner adds, that in this last genus, the dissepiment separating the two cells of the capsule is opposed to the valves, and not parallel with them, as in the Convolvulaceæ. On examining this circumstance, I found the dissepiment parallel with the valve; but sometimes the receptacle, attached to both sides of the dissepiment, appears to divide one cell into two, by means of a projecting half partition, which is applied to the middle of the valve without adhering to it. Hydrolea then, which has the habit of some of the Convolvulaceæ, resembles them also in the structure of its fruit, and is different only in the embryo and its integuments. Nama appears to be more distant, each valve forming a separate cell, by its margins being inflected to the middle of the two central receptacles, which are long, thin and narrow laminæ, set back to back, and presenting their margins in each cell, to which the numerous and minute seeds are attached. The valves discharge the seeds by splitting in the middle, in which state the capsule appears to have four valves. This structure of the fruit, joined to that of the embryo, appears to remove Nama from the Convolvulaceæ; but it is left here till a further examination of its organization shall have determined its proper place.—Gærtner, as well as myself, has observed the embryo of Cuscuta to be long, cylindrical, without any appearance of lobes, and rolled in a spiral round a central body: he does not add any detail which might assist to determine with more certainty the affinity of this genus.—Loeselia will be mentioned in the next family, to which it ought to be removed.

The *Polemoniaceæ* are distinguished by a capsule of three cells, with the valves applied to the angles of a central triangular receptacle, not by their margins, as in the Convolvulaceæ, but by a partition sent off from the middle of the valve. Their embryo is moreover straight, with long broad lobes, and a shorter descending radicle, inclosed in a fleshy perisperm, as Gærtner found it in Phlox and Polemonium, as well as in Loeselia, the fruit of which, formerly ill-understood, but now described by him, is perfectly conformable with that of the two preceding genera. It ought therefore to be ranked in this family; and if it be correct, as this author states, that it has five stamens instead of four, and a calyx surrounded with scales, it must necessarily be united with the genus Hoitzia, belonging to this family: the suspicion of M. Desrousseaux, recorded in the Encyclopédie Méthodique, vol. iii. p. 592. will be thus confirmed.

The Polemoniaceæ, by reason of their fleshy perisperm, have some affinity with the genera mentioned at the end of the Convolvulaceæ, but differ from them, both by the lobes of the embryo being expanded in the form of leaves, as in the Bignoniæ, and by the integument of the seed being composed of only one membrane in the three genera examined by Gærtner. May it not be concluded from this last fact, that their perisperm is only the internal membrane thickened? which will strengthen their relationship with the following family.

I have pointed out the nonexistence of a perisperm as one of the characters of the family of *Bignoniæ*, and Gærtner found none in Sesamum, Bignonia, Martynia, and Pedalium, which have broad lobes, with a small radicle directed toward the umbilicus. But the seed of Pedalium appeared to him not only covered by its two membranes, of which the internal one is a little fleshy, but also enveloped almost entirely by two scales like an arillus, both applied to its back. This organization, which does not occur in other monopetalous plants, needs to be confirmed by future observation. Chelone, which was joined to the Bignoniæ, should be separated from them if it have the fleshy perisperm described by Gærtner, and if, as he says, the two cells of the capsule be formed by the turning in of the margins of the valves to the central receptacle, as in one of the sections of the Scrophulariæ, near to which it ought to be removed.

The family of the *Gentianæ* has been characterized principally by a regular corolla, by the insertion of the seeds upon the margin of the valves of the capsule, and by these margins being more or less turned inwards, sometimes leaving the fruit with one single cell, and sometimes dividing it into two. There were not a sufficient number of observations upon the organization of the seed, to draw any general conclusions from. I had found in Gentiana lutea a fleshy perisperm, in the middle of which was a small cylindrical straight embryo, with a radicle as long as the lobes, directed toward the umbilicus. This solitary fact did not seem to me sufficient; but Gærtner has pointed out the same organization in two other Gentians, in an Exacum, a Chironia, and an Ophiorrhiza; whence this character may be considered as general in the family,—although in Swertia Gærtner describes a very small embryo, placed at a distance from the umbilicus, in a little cavity of the perisperm, which deserves to be again examined.

This general character occurs again, with the regular corolla and marginal insertion of the seeds, in Menyanthes nymphoides, formerly placed at the end of the Primulaceæ, but now acknowledged to approach nearer to the Gentianæ. This plant appears to come near to Villarsia of Gmelin, and to be distinct from the true Menyanthes, or M. trifoliata, in which the receptacles of the seeds are affixed to the middle of the valves, as in the Orobancheæ. The natural place of the true Menyanthes is not easily assigned, because it recedes from the Orobancheæ in having a regular corolla, and in its whole habit, and from the Gentianæ in the point of attachment of its seeds. But if the capsules described by Gærtner under the name of Gentians really belong to this genus, notwithstanding the internal surface of their valves is covered with seeds, and other true Gentians should be found to possess this character, then Menyanthes will make one of the same family, notwithstanding its different habit. From the incomplete observation of Gærtner upon Melasma or Nigrina L., it may be presumed that this genus belongs to the family of the Pediculariæ.

If the remarks of this author be admitted without examination, the family of *Apocineæ* afford very striking differences in regard to the perisperm, of which he found none in three species of Cerbera and one Nerium; in several others he observed one surrounding a central embryo, with an ordinarily short radicle directed toward the umbilicus, and larger lobes, broad and flat. This perisperm is thin in Asclepias, Cynanchum, and Allamanda, more substantial in Rauwolfia and Ophioxylon: that of Vinca rosea occupies the whole interior of the seed, and encloses a minute embryo in a cavity near the umbilicus. At the same time Gærtner describes one membrane only in the seeds which have a perisperm, and two in those which have none. May it not therefore be concluded that there is some uniformity in their organization, and an identity between the perisperm of the one and the internal membrane of the others? Besides, if two membranes be the usual portion of all seeds, ought we not to refuse to admit as perisperm, any but the interior organ, covered by two membranes, and to establish under the name of internal membrane that which is covered only by one? If this explanation be admitted, it would result from it that the Apocineæ have no perisperm, but that several of them have only an internal membrane thickened.

If the general character of this family be thus pursued to rectify what has been given, then a uniformity will be established between all the genera except that of Vinca, in which it will be difficult to deny the existence of a perisperm, on account of its relative bulk to that of the embryo, if the observation of Gærtner be true. This genus may, therefore, with Rauwolfia and Ophioxylon, serve to make a transition from the true Apocineæ to the genera placed at the end of this family, such as Theophrasta, Strychnos, and Ignatia. Gærtner observed in the seeds of the two last a horny perisperm, large and thick, covered only with one membrane, and containing at its centre a considerable cavity, in great part empty, and occupied, only at the part next to the umbilicus, by an embryo with a long cylindrical radicle, and lobes broad and veined like leaves. I had observed this character in the same plants, in uniting them into one genus, but more especially in Theophrasta, which has however a smaller cavity. It is probable that these plants will hereafter form a new family, for which the seed will furnish characters sufficiently determinate.

The following family, the *Sapotæ,* is well characterized by the flower, and especially by the fruit. Each of its cells contains one seed, covered with a smooth shining coat, almost over its entire surface, except at the umbilicus, which is usually very large; which latter character had determined M. Ventenat to name this family *Hilospermæ.* This large umbilicus is common to this and some other families, especially to that of the Sapindi, which would deserve the same name. I have pointed out as the general character of this family a flat embryo surrounded by a fleshy perisperm. And so Gærtner has observed in Mimusops and Achras; and he adds that both have two membranes, a descending radicle, and lobes thin, broad, and veined like leaves. I have observed the same organization in Chrysophyllum; and M. de Beauvois has described the same in his Omphalocarpum, a new African genus which appertains to this family, notwithstanding some apparent deviations.

It ought to be remarked, that in all these genera, the lobes, being as large as the perisperm, divide it in two for part of its length, till their margins come in sight; so that, if by abortion or other cause the embryo should be suppressed, the two portions of the perisperm would be mistaken for the lobes. I thought to avoid this error by considering, in Bassia and in the *Jaune d'Oeuf* of the colonies (Vitellaria of Richard), the two great lobes united at the lower end and occupying the whole interior of the seed, as perisperm, and supposing the abortion of the embryo. Gærtner, however, produces the same fact in Bassia, and calls this part the embryo; but this exception, in so natural a family, is too remarkable not to lead one to hesitate in admitting his opinion, especially as I find, in my collection, seeds nearly of the same conformation with those of Bassia and the *Jaune d'Œuf*, which have the very thin leaflets of the embryo applied to the inner surface of the lobes of the perisperm. We may then, in making these observations, maintain as general to the family, the character drawn from the presence of the perisperm and the form of the embryo. Gærtner admits also a fleshy perisperm in Olax, placed at the end of the Sapotæ, and adds that the fruit has several seeds in each cell. This double character, joined to its monopetalous corolla, is sufficient to keep it at a distance from Fissilia, with which M. Lamarck, in his *Encyclopédie Méthodique*, has been desirous of joining it. It differs likewise from the Sapotæ in having several seeds in the same cell, but may be left at the end of this family till it shall be better understood.

The last of the genera, placed near to the Sapotæ, is Myrsine, which has been examined by Gærtner, according to whom it contains five seeds in one cell, reduced to one by abortion, in which he differs from Linnæus, who admits five one-seeded cells. Its cylindrical, long, serpentine embryo, with short lobes and a very long radicle, is placed transversely, in a fleshy perisperm, near to the umbilicus. The same character appears in Ardisia of Swartz, of which the Anguillaria of Gærtner and my Badula are congeners, and have, like Myrsine, a monopetalous corolla attached below the ovary, stamens facing the laciniæ, and a fruit filled with one solitary seed. M. Ventenat, finding in this structure of the seed a character very distinct from the Sapotæ, has formed of these plants a new family, which he has named, from the form of the embryo, *Ophiospermæ*, of which he has given the character in his Jardin de M. Cels, no. 86, placing it next to the Sapotæ. This finishes the class of monopetalous corollas attached to the part supporting the pistil, the examination of which was the object of this second memoir.

XIX. *Observations upon the Natural Family of the Amaranthaceæ.* *By* Jussieu *.

The family of the Amaranthaceæ appears to be so accurately characterized, that it is not difficult to arrange under it all the genera which belong thereto. Placed in the series of dicotyledonous apetalous plants, in which the stamens are attached below the pistil, it is distinguished from the families related to it, by the embryo of the seed being rolled in a ring around a farinaceous body; stamens in number definite, with filaments sometimes distinct, sometimes united, and sometimes separated by the interposition of scales; a one-celled capsule, generally one- more rarely many-seeded; seeds attached to a central receptacle.

The two sections of this family, the one having naked, the other stipulated leaves, appear to be natural †. In the former the leaves are alternate, in Amaranthus, Celeria, Ærua and Digera; opposite in Iresine, Achyranthes, Gomphrena, and Illecebrum, of which last the number of species is diminished by the removal of those with alternate leaves (Illecebrum *lanatum, javanicum*), which belong to Ærua; and of those with stipulated leaves (Ill. *cymosum, canariense, divaricatum, verticillatum, Paronychia, capi-*

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* Annales du Muséum, vol. ii. p. 131.

This and the following paper by Jussieu were published prior to the foregoing memoirs on the subject of Gærtner's observations; and it was our intention to have given only an abridged account of them in the continuation of our review of the Annales du Muséum: but finding them incapable of much abridgment without doing injustice to their learned author, and thinking them highly interesting, and not unlikely to have some effect in exciting, among English botanists, a greater attention to the natural affinities of plants, we have determined to insert full translations of them here, although somewhat out of order.

† In the author's Genera Plantarum, the family is divided into three sections; so that, when the second is mentioned in this memoir, it applies there to the third section.—Ed.

tatum,

latum, *arabicum*, *alsinefolium*, &c.), which form the genus Paronychia in the second section.

The section with naked leaves may be enriched with a new genus with woody stems, opposite leaves, and flowers in a terminal spike. It is nearly related to Achyranthes, with which it has been hitherto joined under the name of Achyranthes lappacea, Pupal-Valli of Hort. Malabar. vol. 7. t. 43. Its spikes are composed of little spikelets of three or four flowers, each spikelet having three bractes, and bundles of crooked hair surrounded also by their proper bractes: each flower has a woolly calyx of 5 leaves; five stamens, with the filaments united at the base into a cup, with an entire margin; one style with a single stigma. The fruit, which we have not seen, is, according to Rheede, woolly, monosperm, covered with bristly points like the calyx of Burdock. We give the name of Pupalia to this genus, leaving the specific title of *lappacea* till the discovery of other species shall determine whether the bristly fruit be common to them all or not. It is sufficiently distinct from Achyranthes, the flowers of which are not fasciculated, but distinct, and each accompanied by three bractes, and the filaments are united into a tube, often laciniated or furnished with intermediate appendages.

The second section, or that with stipulated leaves, which heretofore contained but two genera, Paronychia and Herniaria, will now be increased by the addition of the three following.

1. Anychia, a new genus described by Michaux in his Flora Boreali-Americana, vol. i. p. 112, which has great affinity with Paronychia, differing only in having stamens without intermediate appendages, and a capsule that bursts at the lower part to discharge the seeds. It is composed of two new species (A. *herniarioides* and A. *argyrocoma*), and one (A. *dichotoma*) already known under the name of *Queria canadensis*, but which is distinct from Queria, pro-

perly referred by Linnæus to the family of the Caryophylleæ, in having a calyx like that of Paronychia, a capsule not opening in several valves, and stamens naturally five, and reduced to three or two only by cultivation, and in consequence of abortion. Gærtner, who has examined this plant, vol. ii. p. 217. t. 128. remarked its separation from Queria, and its affinity with Paronychia; but he attributes to it three stigmas, as in Queria, whereas Michaux admits but two.

2. LITHOPHILA of Swartz, a very small plant from Jamaica, growing upon stones like several mosses, whence its name, covered with scales, very small leaves, and flowers scarcely visible, terminal or axillary, and collected into little heads not larger than that of a pin. Swartz attributes to these flowers a three-leaved calyx, a three-petalled corolla, and an interior two-leaved nectary. But the great affinity which this plant has with the Amaranthaceæ, especially with Herniaria, proves that it is in reality apetalous, and that the parts he calls nectary and corolla are a calyx of five leaflets surrounded by three scales, as in several other genera in this family. By means of these scales it approximates to Illecebrum and Gomphrena; but the scales on its stem, which may be considered as stipulæ, retain it nearer to Herniaria, which like it has also very minute flowers. It differs from both by its simple style and stigma, its distinct stamens reduced to two, and without appendages; but this reduction is perhaps accidental, as in Anychia dichotoma. Swartz suspected its fruit to be bilocular; but its extreme minuteness prevented his ascertaining this point, and it is more probably unilocular with the rest of the family.

3. POLYCHROA, described by Loureiro in his *Flora cochinchinensis*, has an herbaceous stem; alternate, stipulated leaves; monoicous flowers in little axillary racemes; a calyx with five segments less deeply divided in the male flower,

which has five distinct stamens; the female flower has an ovary, crowned by a simple sessile stigma, and becoming a monospermous capsule. Willdenow, in his edition of Loureiro's work, compares this genus with Amaranthus, from which he makes it differ only in having a single stigma; but to this may be added the constancy of the number of stamens, and the division of the calyx, and also the stipulæ accompanying the leaves. This last character fixes Polychroa in the second section, in which it is the only genus with monoicous flowers and alternate leaves.

Thus we see this family enlarged by the addition of four genera; a fifth, described by Loureiro under the name of CYATHULA, ought not to be preserved: it has all the characters of Achyranthes, from which it differs only by its multifid stigma; for what this author calls a corolla within the calyx, is nothing but the union of the filaments. Loureiro himself, and Willdenow also, suspected it to be the Achyranthes prostrata of Linnæus. POLIA, another genus of Loureiro, which Willdenow supposes to be the Achyranthes corymbosa L., ought likewise to be suppressed, and to be expelled, not only from the genus Achyranthes, but also from this family, and transferred to that of the Caryophylleæ, as Lamarck has already done in his Illustrations, vol. ii. p. 129. by joining this plant to Polycarpæa, which is polypetalous.

These two instances in which a plant of the family of the Caryophylleæ has been referred to the Amaranthaceæ, and one of this latter class has been transferred to the former, (and more of the same kind may hereafter occur) prove that there exists a great affinity between the two, as has been already pointed out by Bernard de Jussieu in his *Orders of Trianon*; and that, notwithstanding the distinction drawn from the presence or absence of a corolla, we may at a future time be obliged to bring them together.

XX. *Observations on the Natural Order of Nyctagineæ,*
By JUSSIEU[*].

THE NYCTAGINEÆ, placed in the series of apetalous plants with hypogynous stamens, is remarkable for the union of two characters, apparently opposite, viz. the insertion of the stamens below the ovary, and the same ovary inclosed in the calyx, which, forming a border to it above, appears to make one body with it: a similar union is not met with in any other vegetable. Several characters added to the above, constitute together the general character of this family, already sketched in the Genera Plantarum, to which it is proper to make some additions and corrections to render it more determinate.

The calyx is tubular, commonly swoln at the lower part, where it covers the ovary, contracted a little above this point, and afterwards dilated, ending in a limb either entire or divided, and more or less spreading. This superior part, often coloured, has the aspect of a corolla, and is regarded as such by most botanists. The stamens, in number definite, attached below the ovary, are sometimes entirely distinct; more frequently, by the union of the base of their filaments, they form a tube, which is sometimes thin, at other times thickened into the form of a glandular cup, taking its rise from the support of the pistil, and thus confirming the character of hypogynous stamens. Their filaments, at first united, separate afterwards, and, in passing the narrow part of the calyx, often contract an adhesion to its inner surface, from whence they proceed quite distinct to the attachment of the anthers. The ovary, concealed within the tube of the stamens and the swoln base of the calyx, ends in a style terminated by a stigma, and becomes, in ripening, a single seed, covered by this persistent base, which takes on the form and consistence of a coriaceous capsule, closed at top in the manner of an inferior fruit, or one that adheres to the calyx. The upper part of the calyx, from the point where it is contracted, commonly falls off with the stamens after fecundation. The seed encloses at its centre a granulated body, not unlike paper-pulp [*pâte du papier*], serving the purpose of a perisperm, but not occupying the same place: this substance is surrounded by the embryo, which embraces it almost entirely, in a vertical direction, by its broad lobes. The radicle being bent backwards is directed towards the base of the seed, close applied to the part of the central body left naked by the lobes, which do not totally cover it. The stem is woody or herbaceous, commonly branched; leaves opposite, or rarely alternate; flowers axillary or terminal, and commonly accompanied by an involucre of one or many leaves, enclosing one or several flowers, sessile, like the florets of a Scabious.

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[*] *Annales du Muséum*, vol. ii. p. 269.

The Marvel of Peru of the Gardens (or Belle de Nuit), arranged by C. Bauhin along with Solanum, was the Jalapa of Tournefort. Linnæus, obliged to change the name, gave it that of *Mirabilis*, from the beauty, variety, and singular structure of its flowers. Van Royen, to avoid the use of an adjective to denote a genus, preferred that of *Nyctage*, composed of two Greek words, signifying the Wonder of the Night, which we have adopted as the best, only changing the termination, and have applied the same to the family.

In order to differ less from the manner of describing the Nyctago adopted by the greater part of botanists, who attribute to it a calyx and corolla, we designed this involucrum in our first description of the genus by the name of exterior calyx; but in following analogy it is necessary to reform this appellation, and to say that Nyctago has a monophyllous involucre enclosing a solitary flower: by this change we establish a conformity in the names of the parts performing the same function, and the relationship of this genus to the rest of the family is the more evident.

Five genera are referred to this family in my Genera Plantarum, *Nyctago*, *Abronia*, *Boerhaavia*, *Pisonia*, and *Buginvillæa*. A recent observation made by Richard brings into the same series ALLIONIA, hitherto placed among the Dipsaceæ, but in which this naturalist has observed the stamens to be inserted under the pistil, and the embryo rolled around the perisperm. Its involucre, enclosing three flowers, determines its natural place to be between Nyctago and Abronia: Ventenat, relying upon the same authority, has already made this arrangement.

NEÆA of Peru, described and figured by Ruiz and Pavon, in their Prodromus Floræ Peruvianæ, p. 52. t. 9. belongs to the same family for the same reasons. It appears to approach near to Nyctago, having likewise an involucre, containing one flower, formed of two or three small leaves, regarded as a calyx by these authors, who denominate corolla the true calyx, which persists after the seed is ripe. The insertion of the eight stamens is also hypogynous, and the internal structure of the seed, of which they make no mention, is, from the dissection in the engraving, absolutely the same as in the rest of the family.

If MIRABILIS *viscosa**, figured by Cavanilles in his Icones, no. 3, is regarded as deserving to make a genus distinct from Nyctago, on account of its short tube, limb divided into five segments, stamens reduced to three, and involucre much enlarged after the fecundation of the flower, we shall then have another genus in the family already established by Turra under the name of VITMANNIA, by L'Heritier under that of OXYBAPHUS, and by Ortega, Ruiz, and Pavon, under that of CALYXHYMENIA.

The same work of Cavanilles affords, in the sixth volume, p. 78. t. 598. another genus called TRICYCLA, which, according to his figure, has the greatest affinity with Buginvillæa;

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* Oxybaphus *viscosus* Bot. Mag. n. 434.—ED.

villæa; but its three-leaved involucre includes only one flower instead of three; the number of its stamens is five in place of eight: and Cavanilles makes no mention of an hypogynous staminiferous disk observed in the other; but he describes and figures the central perisperm, and the embryo covering it.

We place here also with hesitation AXIA of Loureiro, his description in the Flora Cochinchinensis, p. 44. being too incomplete to determine its affinity with certainty. The insertion of its stamens, and the structure of its seed, is not indicated, and it may as well be referred to the Dipsaceæ and Valerian, as to the Nyctagineæ; at the same time it may be presumed, from its habit and the inequality of its opposite leaves, to have more affinity with Boerhaavia, and consequently with the latter.

Lastly, OPERCULARIA of Gærtner, described and figured vol. 1. p. 3. t. 24. appears to have some connexion with this family: it has a common calyx or involucre, containing in from three to six hollows as many flowers, each furnished with a single perianthium, which Gærtner calls corolla; an ovary surrounded by a glandular body, to which are attached four stamens; the ovary becomes a single seed surrounded by this body, and concealed in its proper hollow in the common calyx, which thus becomes a kind of capsule, with three or six one-seeded cells. In these several characters, especially those drawn from the insertion of the stamens and the existence of the glandular body, Opercularia approaches to the Nyctagineæ, did not another very striking character remove it from these. Gærtner attributes to it a central, straight, cylindrical embryo, surrounded by a fleshy perisperm, an organization of seed that belongs rather to the Rubiaceæ: we must therefore suspend our judgment till this genus shall have been re-examined in all its parts; or, if we arrange it after the Nyctagineæ, it is with expressing our doubts, and inviting botanists to remove them.

This family, thus enlarged, may be divided into two sections, of which the first will include the herbaceous, the second the ligneous plants: of these Boerhaavia, placed at the end of the first section, has some species that are somewhat ligneous, which makes the transition from one to the other. Each section contains five genera, which we shall give in the order that appears to us the most suitable, bringing together only those characters which distinguish them the most particularly.

SECTION I.

Herbaceous plants, in which the leaves are opposite, and more or less unequal.

NYCTAGO. *Involucre* of one leaf, widening, bell-shaped with five pointed lobes, one-flowered, persistent. *Calyx* funnel-shaped, tube at least four times longer than the involucre; limb expanding, marked with five angles or teeth. *Stamens* 5. *Seed* covered by the thickened, coriaceous base of the calyx, of which the upper part falls off. *Flowers* in terminal corymbs.

OXYBAPHUS. *Involucre*, as in Nyctago, one-flowered, persistent. *Calyx* funnel-shaped, very short, scarcely extending beyond the involucre, divided upwards into 5 lobes. *Stamens* 3, rarely 4. *Seed* as in Nyctago. *Flowers* terminal and axillary in corymbs.

ALLIONIA. *Involucre* of 3 leaves enclosing 3 flowers. *Calyx* small, funnel-shaped; limb unequal, divided on the outer side into 4 lobes. *Stamens* 4. *Seed* covered by the base of the calyx, the upper part of which falls off. *Peduncles* solitary and axillary.

ABRONIA. *Involucre* of 5 or 6 scale-like leaflets, inclosing 12—15 flowers. *Calyx* tubular, much longer than involucre, divided into 5 obcordate lobes. *Stamens* 5. *Seed* covered by the base of the calyx, of which the upper part falls off. *Peduncles* solitary, axillary, terminated by a single head of flowers.

BOERHAAVIA. *Involucre* of several very small scales, accompanying many flowers, or rarely one. *Calyx* very small, oblong; limb divided into lobes. *Stamens* 1 or 2. *Seed* long, covered by the angular base of the calyx, sometimes hispid on the angles, the upper part being deciduous. *Flowers* supported on solitary, axillary, branched peduncles, each division of which is furnished with a scale, and terminated by one or several flowers.

SECTION II.

Plants ligneous. Leaves opposite or alternate.

PISONIA. *Involucre*, some very small scales accompanying one or more flowers. *Calyx* small, funnel-shaped; limb entire, or divided into 5 lobes. *Stamens* 6, sometimes 7—8, projecting beyond the calyx. *Seed* long, covered by the angular base of the calyx, of which the upper part falls off; the persistent part becoming coriaceous, and being commonly hispid on its angles, with hairs or glandular threads. *Stem* in some species furnished with axillary spines. Branches opposite or alternate, like the leaves. *Peduncles* branched, panicled, or corymbose, each division of which, furnished with a caducous scale, is terminated by one or more flowers.

AXIA. *Involucre* of three leaves, unequal, caducous, one-flowered. *Calyx* small, bell-shaped, cut at the top into ten lobes. *Stamens* 3. *Seed* covered by the base of the calyx, furrowed and villous. *Stem* branched, knotty, and repent. *Leaves* opposite, unequal. *Flowers* in terminal racemes.

NEÆA. *Involucre* of two or three scale-like leaflets, one-flowered. *Calyx* tubular, 5-toothed. *Stamens* 8, 4 alternate ones longer. *Seed* oval, covered by the base of the calyx, swelled and fleshy, of the form and size of an olive, crowned by the persistent limb. Shrubs, with leaves verticillate or opposite.

TRICYCLA. *Involucre* of three round, oval leaves, one-flowered. *Calyx* shorter than the involucre, tubular, slightly contracted in the middle, divided at the margin into 5 crenulated lobes. *Stamens* 5. *Seed* covered by the base of the calyx, crowned by its limb, and surrounded by the dried persistent involucre. *Stem* furnished with alternate axillary spines, apparently the origin of young branches. *Leaves* alternate, in bundles. *Flowers* solitary from the middle of the bundles of leaves.

BUGINVILLÆA. *Involucre* of 3 leaves, like that of Tricycla, 3-flowered. *Calyx* shorter than the involucre, slightly contracted in the middle, with the limb nearly entire. *Stamens* 8. *Seed* covered by the base of the calyx, and surrounded by the persistent involucre. *Stem* furnished with axillary spines. *Leaves* alternate. *Peduncles* axillary, with two or three bractes [*involucres*].

Such are the proposed additions to the family of Nyctagineæ, which consists entirely of plants originally foreign to Europe, and is now doubled by the addition of five genera. This increase is the more valuable, because it proves that the particular character, first observed in Nyctago, is not a singularity, or an exception to a general rule, but a mode of organization common to several plants already known, and which will assuredly again occur among the additions made to science by future voyages*.

Among the genera of this family just enumerated, are two which perhaps may belong to the Dipsaceæ, viz. Allionia, formerly referred to that order, and Axia. This possibility of removing some plants from one family to another, seems to mark an affinity between the two, of which some mention has been already made in the observations printed at the end of these families, and which Decandolle has since explained more at large in a memoir read at the National Institute. The characters which seem to unite these two orders are, the union of several flowers in a common involucre, the perianthium not being divided into several pieces, and the persistence of that portion which covers the ovary, the unity of the style, stigma, and seed, and the conformity in habit between some of the plants. But their distinguishing characters are still stronger: each flower in the Nyctagineæ has but one proper calyx or perianthium, whereas in the Dipsaceæ it has two and a corolla, independent of the paleæ or floral scales, growing upon the common receptacle. The stamens in the latter are distinct, and inserted on the corolla only; in the former they are inserted below the ovary, are united at the base of the filaments, and adhere to the calyx at the point where it is contracted. Lastly, the embryo of the Dipsaceæ is central, smooth, with a straight superior radicle, surrounded by a membrane slightly fleshy that can hardly pass for a perisperm; that of the Nyctagineæ is rolled around a granulated perisperm, placed in the centre of the seed, upon which the radicle is bent back from above downwards.

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* At the moment that this memoir is put to the press, we find in the herbariums of Peru and Brazil, three plants of this family, of which the characters at first sight are sufficient to form new genera.

Some botanists may be tempted to lessen one of these differences, by regarding the coloured calyx of the Nyctagineæ as a corolla, particularly that of the Marvel of Peru, for which they may claim the authority of Tournefort, Linnæus, and their followers, who admitted this corolla in considering as calyx the one-flowered involucre of this genus, of which it has in effect all the appearance. But on the one hand we cannot denominate corolla a persistent calyx that forms a capsule surrounding the seed, as is the case in Nyctago and in the whole family: again, we cannot give different names and attributes to the same organ in other analogous genera, and call that corolla in Nyctago, which in Boerhaavia, Abronia, and Buginvillæa, is evidently a calyx. Upon the other hand, if the identity of the organization in the genera just mentioned be allowed, and an involucre of three leaves enclosing three flowers be admitted in Buginvillæa, an involucre of several leaves enclosing a greater number of flowers in Boerhaavia and Abronia; if it cannot be denied, that the external perianthium of Nyctago, called its calyx by many botanists, differs from the involucre of Abronia, in nothing but in being one-flowered and one-leaved, fulfilling otherwise the same functions; the natural consequence of this acknowledged analogy will be to admit in Nyctago a monophyllous involucre, enclosing a solitary apetalous flower, furnished with a calyx, of which the upper part is deciduous, and the base persistent around the seed.

Having thus settled invariably the nature and denomination of the organs of the flower of the Nyctagineæ, the differences subsisting between this family and that of the Dipsaceæ, provided with a corolla, may be the more positively asserted; there will be less inducement to arrange them in the same series; and less repugnance in referring the one to the monopetalous epigynous plants, and the other to the class of apetalous flowers, with stamens hypogynous, or inserted below the pistil. At the same time it must be acknowledged, that this insertion, and the absence of a corolla, are almost the only characters that establish an affinity between the Nyctagineæ and the other families of this class, viz. the Amaranthi, the Plantagines, and the Plumbagines. These three last have indeed a perisperm, which is likewise central in the Amaranthi, but then it is farinaceous, and not granulated; it is only surrounded, and not covered, by the embryo, which is in form cylindrical, in situation circular. In the Plumbagines and Plantagines the perisperm is fleshy, and surrounds the embryo, which is always straight, broad, and flat in the former, and cylindrical in the latter.

From all these observations it results, that the Nyctagineæ, of which the organization is very singular, have not so determinate an affinity with any other known families, but that they may be removed to occupy another place in the general series of plants. The naturalist engaged in the pursuit of botanical affinities, will draw from them likewise another conclusion. The obstacles which here impede the precise determination of these affinities, will confirm him in the belief of the existence of new families, of which not one species has yet fallen under his cognisance. For if Nature, who establishes regular degrees of affinity among all organized beings, has placed, in distant regions, a family of plants so different from all those that cover our soil, she must without doubt have collected, in the same countries, other families related to this, and adapted to form the point of union between this insulated order and the numerous series of European plants.

XXI. *Observationes botanicæ Genera et Species Filicum illustrantes.* *Auctore* O. SWARTZ*.

(Tab. IX. X.)

ACROSTICHUM *latifolium.*

In insula St. Helenæ et ad Promontorium Bonæ Spei Africes etiam provenit.

ACROSTICHUM *quercifolium.*

Vera hujus generis species, minime *Onocleæ.* Indusio omnino caret. Margines frondium fructificantium planiusculæ obsolete repandæ nec inflexæ, licet capsulæ intra marginem laciniis insideant.

ACROSTICHUM *sulphureum, calomelanos, et chrysophyllum.*

Species, peculiares ob capsulas venis ramosis adsidentes inque farina colorata quasi subimmersas, diversum ab Acrostichis forsan efficere merentur genus.

MENISCIUM.

Lineolæ fructiferæ internerviæ transversales, semilunares, absque indusio.

MENISCIUM *reticulatum*

Linnæus ad Polypodia refert ob fructificationes senescentes puncta subrotunda mentientes; Jacquinus vero ab intuitu filicis ætatis tenerioris ad Asplenium amandavit, quod tam situs et figura fructificationum quam absentia indusiorum negant.

HEMIONITIS.

Character genericus quem dedit Cel. Smith, omnibus speciebus huic generi ab illo allatis, certissime non convenit. Hemionitides veræ certissime carent indusio, quo H. *grandifolia* et *plantaginea* (Smith) instructæ sunt, et quidem binis e vena inter lineolas geminatas fructiferas ortis, quod characterem bonum distincti generis ab Asplenio diversissimi præbet. Cfr. Diplazium.

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* Schrader's Journal für die Botanik, Zweites Stück 1801 (1803).—Conf. Swartz's *Genera et Species Filicum*, &c. Annals of Botany, vol. i. p. 426.

HEMIONITIS *rufa.* (*Aerostichum rufum* L.)

Acrostichum refert frondibus fertilibus fructificationibus quasi repletis, habitu, mollitie et pubescentia H. *palmatæ* simillima filix. Capsulæ e venis dichotomis, parallelis, approximatissimis oriuntur, hinc characteri Hemionitidis propius accedit. Novum inde genus, *Gymnopterin* scilicet, concinnavit Cl. Bernhardi, sed vereor Illum præter necessitatem genera multiplicasse.

HEMIONITIS *japonica.*

Lineæ fructificantes obliquæ, e costa pinnarum ad marginem excurrentes, dichotomæ, tenuissimæ, approximatæ. Capsulæ nudæ absque villo e lineis simplici serie prorumpentes, absque indusio *.

POLYPODIUM *ensatum.*

Puncta fructificationis sparsa, rara, 3—5 inter nervos, magna, globosa, elevata, nec depressa seu frondes supra pustulatæ. Substantia frondis tenuior quam in P. *phyllitide* s. *repenti.* Venæ undulatæ. Color fusco-viridis, opacus.

POLYPODIUM *hastatum.*

Differt a P. *phymatode* fronde hastata, laciniis a basi frondis divisis; in illo laciniæ infimæ decurrunt. Puncta fructif. supra pustulata. Singularis illa depressio seu immersio punctorum fructificationis, unde frondes in pagina superiore quasi pustulatæ videntur, sequentibus propria est:

P. lanceolatum.	P. heterophyllum.
— simplex.	— immersum.
— surinamense.	— piloselloides.

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* *Hemionitis esculenta*, Retz. Obs. 6. 32. est species Diplazii s. *Diplazium esculentum*, frondibus pinnatis, pinnis lato-lanceolatis apice attenuatis, inciso-crenatis.

P. lycopodioides.
— ensiforme.
— phymatodes.
— pustulatum.
— latifolium.
— falcatum.
— tenellum.
— hastatum.
P. scandens.
— loriceum.
— pendulum.
— vulgare.
— virginicum.
— trifoliatum.
— rigidulum.
— tæniatum.

POLYPODIUM *quercifolium*.

Frondibus radicalibus sessilibus ovatis sinuatis deficientibus, varietatem P. *aurei* esse facile crederetur.

POLYPODIUM *iluense* (*Acrost. iluense* Linn.).

Hoc pro diversa specie habet Cel. Hoffmann nomine *Polypod. Marantæ*. Figura *Pluk. Phyt. t.* 179. *f.* 4. et *Moris*. 14. 3. 23. hujus sunt.

POLYPODIUM *hyperboreum*.

Huic, quod a P. *iluensi* absque dubio diversum, figura *Pluk. Phyt. t.* 89. *f.* 5. convenit, quam P. *arvonico* suo allegavit Cel. Withering, a P. *hyperboreo* forsan distincto.

POLYPODIUM *phegopteris*.

Indusio omnino caret. Ergo filix quam pro P. *phegopteride* salutat Cl. Roth, involucro peltato tanquam prædito, si ulla, diversissima videtur species.

POLYPODIUM *glaucum*.

Idem in montibus nubigenis Jamaicæ, omnibus partibus speciei Japonicæ homonymæ simile, provenit. Fructificationem tamen illius non vidi. P. *dichotomo* et *furcato* proximum, et simul ac hæc duo ab aliis Polypodiis discedit habitu. Cæterum P. *dichotomum* et *furcatum* id peculiare habent, quod capsulæ annulo vero omnino careant, more exannulatarum. In *furcato* autem evidenter adest. Tamen hæ tres species, inter se maxime affines, certe non disjungendæ, et proprium forsan constituunt genus, sicut in litteris indicavit Cel. Willdenow.

POLYPODIUM *Dryopteris.*

Synonymon ex *Flora Dan. t.* 759. a quibusdam allatum, minime hujus loci, sed ad *Aspid. spinulosum* (vulgo Polypod. cristatum) pertinet. Puncta fructificationum nuda indusio revera destituta sunt, ideoque P. *Dryopteris* Cl. Roth a specie Linnæana diversum est.

ASPIDIUM *trifoliatum.*

Species valde polymorpha. Frondes juniores simplicissimæ cordatæ; aliæ trilobæ basique auriculatæ evadunt; aliæ tripartitæ s. omnino trifoliatæ, foliolo intermedio semper majori, subinde pariter tripartito, lateralibus basi extrorsum auriculatis lobatis (cfr. *Jacq. Ic. rar.* 3.), omnibus margine integris s. magis-minusve repandis s. incisis. Rarius frons subpinnata invenitur, pari scilicet pinnarum supremo lateralibusque interjecto.

Polypodium pica (Linn. Suppl.) ab *Aspidio trifoliato* (fronde triloba basi extrorsum auriculata) non discrepat, nisi stipite nervisque primariis perfecte nigris lucidisque, in *trifoliato* pallidioribus.

ASPIDIUM *exaltatum.*

Hanc s. aliam huic simillimam filicem ad *Davallias* retulit Cl. Smith (*Tent. de fil. dorsif. in Act. Taur.*). Verumtamen, præter habitum a *Davalliis* alienum, indusium ejus illo quod *Aspidiis* pluribus commune magis assimilatur; est enim cordato-subrotundum, planiusculum, lateri adfixum. Hujus indolis etiam sunt indusia A. *cordifolii, undulati, hirsutuli, biserrati* et *limbati.*

ASPIDIUM *Oreopteris.*

Indusia exilia nonnisi in fructificationibus junioribus detegenda, in adultioribus plane obliterata. A. *marginali* situ fructificationum valde simile est, figura vero et dispositione pinnarum pinnularumque sat diversum.

ASPIDIUM *cicutarium.*

Variant frondes pro ratione ætatis, pinnatifidæ spithameæ et bipinnatifidæ bipedales.

Aspidium *cristatum.*

Polypodium cristatum Linn. P. *Callipteris* Ehrh.

Ab *Aspidio spinuloso* evidenter differt *pinnis* tantum bipinnatifidis, laciniis oblongis obtusis apice dentatis, nec acutis mucronato-serratis, et forma frondis rigidiusculæ ovato-lanceolata, nec ovato-triangulari.

Aspidium *spinulosum.*

Polypod. cristatum vulgo.—Variat fronde bipinnatifida usque ad tripinnatifidam, sicut in vallibus umbrosis saxosisque provenit, cujusque varietatis synonymon *Polystichum multiflorum* Rothii erit.

Aspidium *pteroides.*

Puncta fructif. valde approximata, distincta tamen, margine extimo pinnarum insident, fructificationem Pteridis (intuitu fugitivo) mentientia. Hinc, ni fallor, *Pteridem interruptam* (Willd. Phyt.) unam eandemque filicem omnibus partibus simillimam esse opinor.

Aspidium *Sophoroides.*

Polypodium unitum Thunb. flor. jap.

Laciniæ pinnarum serraturis similes apice recto, nec sursum nec deorsum spectante. Infimæ ceteris duplo longiores ut in A. *patenti,* cui longitudine æquales sunt; superior tamen opposita *Sophoroidis* longior, ut in A. *auriculato.*

Aspidium *parasiticum* et *molle.*

Vix separandas esse mihi videntur. Indusium hujus in icone Ill. Jacquini minus expresse depingitur; cordato-peltatum est, hirsutie erecta superne tectum. Tale quoque inest A. *inviso, patenti, pennigero, attenuato, deltoideo, tetragono,* &c.

Aspidium *Thelypteris.*

Indusium fugax, ad fructificationes nuperrime eruptas tantum obvium, incumbens, basi attenuatæ adfixum, antice fornicatum, album atque diaphanum. Certe nec peltatum est, nec ad punctum centrale fixum, ut indicavit Cl. Roth (*Tent. fl. germ.* 3.).

Aspidium *fragile.*

Ad Cyatheas retulerunt Smith et Roth. Nec tamen indusium adest calyciforme hemisphæricum, nec apice dehiscit. Omnino laterale est, e vena cui glomeruli capsularum insident ortum, concavum, acuminatum, medio latius, apice ciliato-lacerum, initio capsulas tegens, demum ad alterum latus reflexum. Hujusmodi indusiis A. *incisum, dentatum, regium, fontanum, multifidum, bulbiferum, montanum* et *capense* gaudent. Sic cum A. *filici femina, umbroso* et *axillari* conveniunt, quibus indusia tenuissima margine ciliato-lacera sunt, licet basi reniformi semilunari adfiguntur.

Aspidium *rheticum.*

Filix rhetica tenuissime denticulata *Bauh. hist.* 3. *p.* 740. fig. mala.

Variat fronde tripinnatifida et tripinnata.

Indusia subintegra, cordato-subrotunda.

Aspidium *Filix femina.*

Species valde polymorpha, in prima ætate ab adultiore vix dignoscenda, quasi multo minor minusve subdivisa, etiamque fructifera, nec non, sicut A. *fragile*, omnibus partibus tenera et debilis. Pinnulis obtusis acutioribusque variat. Hinc *Polypodium molle* Schreb., *trifidum, dentatum, incisum* et *ovato-crenatum* Hoffm. varietates hujus sunt.

Aspidium *axillare.*

A. *filici feminæ* simillimum, sed magis subdivisum.

Conveniunt imprimis inter se species sequentes *Aspidii:*

A. *Lonchitis, mucronatum, falcatum, trapezoides, triangulare, auriculatum.*

A. *exaltatum, hirsutulum, biserratum, undulatum, cordifolium.*

A. *unitum, serra.*

A. *sophoroides, obtusatum, attenuatum, invisum, patens, pennigerum, molle, parasiticum.*

A. *Oreopteris, limbatum, marginale, pteroides.*
A. *cristatum, spinulosum.*
A. *rigidum, aculeatum, lobatum, aristatum, vestitum.*
A. *filix mas, elongatum.*
A. *fragile, trifidum, regium, fontanum, alpinum.*
A. *filix femina, umbrosum, axillare, æmulum.*

ASPLENIUM *septentrionale.*

Acrostichum septentrionale Linnæi nec Acrostichum nec Pteris esse potest. Fructificationes ætate quidem confluunt, indusium vero adest, quo Acrostichum caret. Fructificatione submarginali generi Pteridis propius accedit. Non tamen ipso margini frondis, sed intra illum a margine parum remotæ insident, lineolæ fructiferæ ipso nervo submarginali, quo indusium, intus versus dehiscens, ortum suum ducit. Sæpe lineæ 2—3 interruptæ alternæque sunt, unde Aspleniis simillimæ, quamvis non obliquæ fiant.

Aspl. Breynii s. *alternifolium* Jacq. huic proximum lineis capsuliferis margine parallelis aliisque notis.

ASPLENIUM *Ceterach.*

Indusio Aspleniis proprio carent fructificationes. Distinctum revera genere a *Scolopendrio* (cfr. *Roth tent. fl. germ.* 3.) cujus lineæ fructiferæ inter venas erumpunt. In A. *Ceterach* ab ipsa vena oriuntur, squamulis dense imbricatis pinnularum aversæ frondis tectæ, inter quas maturitate propullulant. Sic pro indusiis squamulæ inserviunt.

ASPLENIUM *australe* et *radiatum.*

Lineis fructificantibus indusiisque consimilibus cum A. *septentrionali* conveniunt. Hinc ab *Acrosticho* jure removeantur.

ASPLENIUM *cordatum.*

Fructificationes ut in A. *Ceterach* dispositæ inter squamas paleaceas, in pagina inferiori frondis absque distincto indusio prorumpentes.

Asplenium *bulbiferum.*

Icon pinnæ a Cl. Bernhardi in *Dissertat. de genere Asplenii* (Soc. Elect. Mog. scient. util. quæ Erfordiæ est, prælecta) Tab. fig. 7. huic dicata, ad *Aspl. rhizophorum* pertinet, nec A. *bulbiferi* esse potest; pinnulæ enim ejus decurrentes sunt atque oblongæ acuminatæ, inciso-serratæ, superne proliferæ: A. *rhizophori* vero rhombeo-ovatæ, obtusæ, dentatæ, baseos subauritæ, &c.

Cænopteris *rhizophylla.*

Icon Cl. Smithii (*Pl. ined. t.* 50.) filicem primævam minusve perfectam exhibet.

Cænopteris *Odontites.*

Pinna, cujus icon dedit Cl. Bernhardi in dissert. citata de genere Asplenii Tab. fig. 3. hujus est, minime *Cænopter. flaccidæ*, quæ simpliciter pinnata et pinnis elliptico-lanceolatis incisis serratis gaudet. Cfr. Fig. *Thunb. in Act. n. Petrop.* IX. *t.* D. *f.* 1. 2.

Cænopteris *cicutaria.*

Charactere generico quidem minus apte respondet, lineolis fructificantibus non semper marginalibus sed in pagina frondis subinde Aspleniorum more sparsis, indusiis et extus et intus dehiscentibus, quod in *Asplenio caudato* Forst. *bissecto, præmorso, dimidiato, fragranti, rhizophoro* nec non *ambiguo* rarius observatur. C. *cicutaria* ideo est media quasi species. Proximis vero congeneribus, C. *rhizophylla* et *myriophylla* characteri bene consonantibus, comparata, huic (Cænopteridi) libentius associanda videtur. Si in unum genus *Cænopteridem, Blechnum, Woodwardiam, Lonchitin* et *Pteridem* cum Aspleniis genuinis Linn. in modum Bernhardi concumulamus, character Asplenii obscurus certe evadit. Transitus ab uno in alterum genus ubique occurrunt, perque tot et tantas conjunctiones invitas chaos in scientia pareretur!

Pteris *thalictroides.*

Ab Acrostichis aliena filix; fructificationes enim margine insident et ab illo obteguntur. Capsulæ a forma aliarum annulatarum discedunt, ab annulo latiusculo et diaphano transverse plicato, valvulam laceratam mentiente, fere totæ formatæ.

Pteris *Adscensionis.*

Species Lonchitidis diceretur, si ad specimina juniora respicias, fructificationes sinubus tantum subjectas gerentia; ætate vero provectiore lineolæ totum marginem pinnularum præter apicem occupant, ideoque *Pteridibus* conjungi debet simul ac P. *podophylla, comans, esculenta, serraria,* &c. quarum fructificationes apices pinnarum non contingunt.

Pteris *caudata, esculenta, capensis.*

Species simillimæ, non nisi ex speciminibus perfectioribus rite inter se dignoscendæ.

Pteris *heterophylla* Plum. Fil.

In quibusdam notis cum *Pteride crispa* convenit. Præter staturam proceriorem, pinnulis cuneato-oblongis, serratis, fertiliumque angulatis apice dentatis facile distinguitur. A fructificatione ad angulos harum quasi interrupta olim inter Adianta locum tenuit (*Linn. Spec. Pl.*), sed lineæ continuæ sunt; ergo Pteridis vera species, pariter ac

Pteris *crispa.*

Osmunda crispa L. *Onoclea crispa* Roth, Liljeblad, Bernhardi, aliorumque.—Ab Osmundis capsulis annulatis discedit. Speciem Onocleæ plurimi perhibuerunt, pinnulas fertiles lineares fructificationibus repletas esse animadvertentes, margine inflexo obtectis. Si vero attente observetur, fructificationes incipientes marginem tantum occupant, quod in speciminibus ex Sibiria allatis, pinnulis fertilibus parum latioribus donatis, mihi videre licuit.

Pteris *trichomanoides.*

Fructificationes marginales sunt, setis fasciculatis interspersis, margine pinnarum leviter involuto (in speciminibus junioribus) tectæ. In adultioribus margo obsoletus, quo fructificationes quasi nudæ conspiciuntur; hinc Bernhardi filicem, licet speciem Pteridis genuinam, ad Acrosticha retulit, nomine *Acrost. pterioidis.*

Pteris *argentea.*

Hanc pro varietate P. *pedatæ* habuit Linnæus; distinctam vero esse videtur statura minori, incisura delicatiori, marginis frondis farina alba peculiari postice tectis.

Pteris *hastata.*

Frons initio simpliciter pinnata (ut in *Adianto hastato* L.), s. composita et quidem supradecomposita occurrit, hinc in plures species minime dilacerari debet.

Indusio plicato optime nota species.

Species e Prodromo Fl. Cap. et Flora Japon. Thunb. inter inquirendas enumeratæ, quoad fructificationem adhuc obscuræ manent. Propter habitum *Pteridibus* plerisque consentaneum, ad idem genus ab Auctore relatæ sunt.

Onoclea *sensibilis.*

Hanc ad filices annulatas pertinere nullum esse puto qui dubitet. Linnæus characterem primo a Mitchelio in *Act. Nat. Cur. p.* 29. datum retinuit, licet nomen Angiopteris in Onocleam mutavit. Secundum Mitchelium fructificationes sunt capsulæ in spica racemosa disticha ordinatæ, globosæ, 1-loculares, 5-valves, semina numerosa scobiformia longa villosa foventes, receptaculo proprio columnari singulæ valvulæ capsularum adsidentia. Spicas tamen vetustas solummodo vidit, quarum capsulæ veræ e pinnis (Ejus capsulis) a primo in globum contractis demumque ruptis dudum deciduerunt, receptaculis venis pinnarum insertis superstitis (villi numerosi scobiformes), quas pro seminibus perperam habuit.

Pinnulæ irregulariter inter nervos plerumque quinquefariam dehiscunt sive dilacerantur. Membrana tenuissima nervos sequitur, cujus ope pinnæ fructiferæ in globulum contractæ intus in loculos quasi dividuntur*.

Onoclea *struthiopteris*. (Osmunda L.)

Onocleæ sensibili habitu et fructificatione valde adfinis. Pinnæ hujus fructiferæ tantum pinnatifidæ, pinnulæ 5, laciniis alternis approximatis ante maturitatem capsularum seorsim globoso-recurvatis, demum ruptis evolutisque oblongis planiusculis paleaceis nervosis apice laciniatis, capsulis numerosis pedicellatis tectis. Perbene Struthiopteridem descripsit Cel. Roth, *Catal. p.* 129.

Discrepant ab his Onocleis ceteræ species hujus generis, nempe O. *capensis, lineata* et *attenuata*, pinnis fertilibus integris, indusio tamen e margine membranaceo utroque latere versus costam inflexo, nec non sæpe illi adnascenti, instruuntur.

Hac nota essentiali a Pteride et Blechno distinguitur Onoclea. In illa fructificationes tantum marginales sunt, indusio ex margine parum inflexo tectæ. In hac vero (Blechno) lineæ fructif. continuæ costæ utrinque approximatæ, s. inter costam et marginem longitudinaliter dispositæ videntur, indusiis superficiariis (nec e margine ortis) versus costam utrinque dehiscentibus, præditæ. Sic Blechnis magis adfines sunt Onocleæ, quæ pinnis integris gaudent; et vice versa Onocleis approximantur plures species Blechni, e. g. *rigidum, boreale, Onocleoides, procerum*, et *punctulatum*, quorum vera cognitio generis ex dispositione indusii quærenda est. Fructificationes non raro, ut in speciminibus adultioribus subinde contingit, totam paginam replent, speciem *Acrostichi* mentientes. Indusia verumtamen adsunt, simul ac vestigia illorum in vetustis. In *Acrosticho* plane desiderantur, licet margo frondis fructiferæ planus ultra capsulas extendatur, ut in A. *quercifolio*, *peltato*, *alieno* &c., nunquam vero inflectitur.

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* Vid. Annals of Botany, vol. i. p. 118.—Ed.

BLECHNUM *australe*.

Varietatem B. *occidentalis* Cel. Sprengel in Diar. botan. 1799. 2. p. 270. pronunciat; diversissimum vero ab illo omnibus partibus est, scil. figura frondis lineari-lanceolata, pinnis cordatis multo brevioribus mucronatis margine scabris, lineisque fructiferis latioribus.

Pinnæ B. *australis* subinde cordato-hastatæ.

BLECHNUM *procerum*. (Osmunda Forst.)

Onocleis proximum fructificationibus senescentibus totam paginam quasi occupantibus, indusiis latiusculis tectis; sed fructif. in lineam inter costam et marginem utrinque disponuntur, indusio exacte superficiario, licet a margine parum remoto.

Huic generi absque dubio justo adnumeratur *Acrostichum lineare* Spreng. (*Asplenium Woodwardioides* Bernhardi) fructificationibus costa contiguis, ut in *Blechno orientali*.

WOODWARDIA.

A *Blechno* optime distinguitur punctis fructiferis oblongis distinctis licet approximatis, indusiis fornicatis. In Blechno (*occidentali*, *punctulato*, *Acrostich. lineari* Spreng.) lineæ fructiferæ subinde (licet rarissime) interruptæ sunt, Woodwardiæ speciem referentes, indusiis tamen minime fornicatis.

LINDSÆA.

Habitu cum Adianto potissimum convenit. Capsulæ vero in lineam continuam versus margines pinnarum fere ut in Pteride ordinatæ sunt, in plerisque tamen a margine parum distantes. Indusio præterea superficiario (nec marginali) exterius dehiscente a Pteride abunde differt.

LINDSÆA *trapeziformis.*

Act. Soc. Linn. Lond. 3. 42. *t.* 9.

LINDSÆA *falcata.*

Pinnæ non falcatæ sunt, sed potius sublunatæ. Cfr. fig. in *Act. Soc. Linn. Lond.* 3. *t.* 7. 2.

ADIANTUM *caffrorum.*

Hoc olim speciem Polypodii æstimavit Linnæus, rectius vero in *Supplemento plantarum* ad Adianta retulit; et ægre ab his separatur, nisi omnia mihi sic dicta *Adianta spuria* diversum constituerint genus, ut voluisse videtur Cl. Bernhardi; sed miror, illum *Adianto caffrorum*, novo quasi generi, nomen pristinum *Lonchitidis* (genuinis speciebus ad genus ejus polymorphum Asplenii amandatis) iterum adoptasse. Figura cæterum, quam dissertationi suæ de Asplenii genere sub nomine *Lonchitidis caffrorum* (fig. 10.) allegavit, alius est speciei, seu *Adianti fragrantis* seu *multifidi*. Pinnulæ A. *caffrorum* subtus rachibusve evidenter paleaceo-hirtæ sunt; in A. *fragranti* et *multifido* omnino nudæ.

DAVALLIA.

Fructificationes marginibus s. potius versus apices pinnularum insident, indusiis squamiformibus superficiariis exterius dehiscentibus tectæ. Species pleræque habitu *Adiantis* assimilantur, aliæ fructificatione *Hymenophyllis*. (D. *contigua*, *acuminata* et *falcata.*)

DAVALLIA *elata.*—(*Wibelia elata*, Bernhardi.)

A cæteris Davalliis minime disjungenda nec ratione situs fructificationum nec figura indusiorum. Adfiguntur hæc in variis speciebus squamarum instar, s. tota s. ad medium usque, basi tamen semper urceolum subrotundum s. oblongum formantia, cujus alterum latus ab ipsa pagina frondis cingitur; ore attenuatum s. rotundatum, s. truncatum integrum s. lacerum. Sic natura indusii et absentia receptaculi filiformis a Trichomaneis et Hymenophyllis facile dignoscuntur Davalliæ, habitu frondis rigidiori notabiles.

Heic silentio non præterire oportet, *Wibeliam multifidam* Bernhardi a *Trichomane multifido* Forst. diversissimam plantam, et (ni valde fallor) synonymum *Davalliæ epiphyllæ* (Trichom. epiphylli Forst.) esse. *Trichomanes* vero *multifidum*, utpote vera species *Hymenophylli*, H. *fucoides* et ipso H. *tunbridgensi* in multis convenit. Cfr. *Forst. austr.* 85. *n.* 473.

DAVALLIA *clavata.*

Species hujus generis erit contra opinionem Cl. Bernhardi, qui illam Lindsæis congenerem esse contendit. Fructificationes ipso apici lacinularum insident nec a margine remotæ. Indusium etiam hujus illo D. *chinensi* et *tenuifoliæ* conforme est, et fere ut in *Hymenophyllo* bivalve.

DICKSONIA.

Indusio distincte duplici a Davalliis imprimis differt.

DICKSONIA *flaccida.*

Dennstedtia, genus novum a Cl. Bernhardi (*Diar. botan.* 1800. 2. *p.* 124.) concinnatum, a *Dicksoniis* certe non separari debet. Habitu quidem teneriori s. molliori a *Dicksoniis* l'Heritieri et *squarrosa* (*Trichom. squarros.* Forst.) discedit Polypodiisque approximatur, pariter ac D. *marginalis*, *strigosa*, *japonica*, *polypodioides*, *multifida* et *zeylanica*, Cyatheis forma indusii primo intuitu accedentes. Dispositio tamen fructificationum ad sinus laciniarum, eis superne concave incumbentium, affinitatem proximam cum *Dicksoniis* demonstrat. Conjunguntur quoque mediantibus *Dicksonia dissecta* et *cicutaria*. Figura indusii (perisporangii) loco cit. Tab. 1. f. 3. hanc particulam non exacte repræsentat; anteriori enim latere tantum adfigitur more fere Davalliarum solito, nec integrum urceolum efficit.

Tuberculum demum centrale minutissimum, cui (sporangiophori loco) capsulæ pedicellis suis insident, omnibus speciebus familiare.

DICKSONIA *multifida.*

Cænopteris japonica. Willd. phyt. I. n. 40.

Diversissima a *Polypodio punctato* Thunb. Flor. Japon. p. 337. a Willdenow citato, cui, secundum specimina Ipsius inventoris, stipes est punctis purpureis adspersus; pinnulæ lanceolatæ. Puncta fructif. nuda, indusiis plane carentia.

Nec generi *Cænopteridis* adsociandum erit. Fructificationes in punctis *nec lineolis* submarginalibus congestæ infra sinus s. serraturas, ut in aliquot *Dicksoniis,* indusio consimili gaudentibus.

CYATHEA *medullaris.*

Sphæropteris Bernhardi.

Diversum certe non meretur efficere genus, ut voluit Cl. Bernhardi (dicto loco p. 121.) ob formam globosam indusiorum, quæ, superne disrumpentia, speciem calycis margine laceri, capsulisque repleti, præbent. In *Cyathea arborea* simillima sunt, licet a Plumiero margine integerrimo s. veluti circumscissa depinguntur. (*Hist. fil. t.* 2.) Receptaculum centrale, omnibus Cyatheis commune, cui capsulæ adnectuntur, etiam in C. *medullari* visum scrutatoris non fugere debet.

TRICHOMANEN et HYMENOPHYLLUM genera maxime affinia esse, certe non negare queamus; facillime veruntamen forma indusiorum inter se dignoscuntur. Prioris semper urceolatum est, quod in altero evidenter bivalve absque fundo infundibuliformi, quo receptaculum capsularum filiforme s. columnula in Trichomaneis emittitur. Insimul quidem non reticendum est, indusia urceolata quorundam *Trichomanorum* (*reptantis, muscoidis,* &c.) valvulis cujusdammodi terminari; hinc affinitas utriusque generis patet; distinctio tamen in dubium certe non revocanda. In quibusdam Hymenophyllis fundus indusiorum parumper depressus est, valvulis basi leviter cohærentibus; in pluribus tamen speciebus reapse diphylla esse, extra omnem dubitationis aleam poni debet. Cfr. H. *fucoideum*, *asplenioideum*, *polyanthos*, *undulatum*, &c. ab Hedwigio accurate depicta.

TRICHOMANES *membranaceum*.

Medium fere inter Adiantum et Trichomanen. Toto enim margine frondis tenuissimæ, lobatæ, planæ, radiato-venosæ, leviter transverse rugosæ, læte virentes, insident squamulæ orbiculares, contiguæ, venas terminantes, geminatæ, medio cohærentes, utroque latere frondis dehiscentes, pallide rubicundæ; hinc Adiantum mentitur. Urceoli tamen fructificantes, frondi inter squamulas inserti (rarissime licet provenientes) ore bilamellato minimo, Trichomanen indicant.

SCHIZÆA.

Ad *Filices annulatas* stricte sic dictas, quibus perperam adnumeravi, non pertinet. Loco annuli, capsulæ obovatæ s. subturbinatæ latere dehiscentes, vertice concentrice striatæ sunt, ut in Osmundis ex India occidentali observatur. Potius itaque conjunctim *subannulatæ* seu *annulis spuriis donatæ* dicerentur. Tam hoc respectu quam habitu frondium fructificantium ab Onocleis maxime discedunt Schizeæ, ut certe comparari nequeant; Osmundis vero antillicis magis adfines sunt, et ab his vix differunt nisi marginibus membranaceis appendicum frondis (spicæ Willden.), qui ad latera capsularum, ordine duplici dispositarum, leviter inflectuntur, speciem indusii, spicillis imprimis junioribus, præbentes.

SCHIZÆA *dichotoma*.—*Ripidium* Bernhardi.

Appendiculi frondis initio connivent, demum revolvuntur.

tur. *Acrostich. dichotomum* Linn. et Forst. specie ex mente Bernhardi diversa sunt; vix attamen credo. Absentiam annuli veri animadvertens, Cel. Sprengel (*Diar. bot.* 1800. 2. *p.* 267.) hanc filicem ad Osmundas retulit. Ratione vero habitus proprii et dispositione capsularum totius generis, Schizæa ut distinctum genus jure censetur, cujus character sic emendaretur:

Capsulæ biseriales, subturbinatæ, appendiculis (spicillis) frondis unilateralibus insidentes, sessiles, superne concentrice striatæ, latere dehiscentes.

Indusium? e margine appendiculi subinflexo *.

SCHIZÆA *pectinata*, *dichotoma*, *elegans* et *bifida* Willd. omnes eundem characterem genericum servant.

SCHIZÆA *spicata*.

Ad *Onocleam* referenda est, ob capsulas numerosissimas vere annulatas, totam superficiem apicis frondis obtegentes, *indusio* e margine membranaceo ad costam usque inflexo tectas.

OSMUNDA.

Capsulæ, quæ confertim s. fasciculatim pinnulis frondium fertilium insident, subinde quoque in pagina aversa accumulantur, forma duplici sunt. Aliæ vertice concentrice striato reperiuntur, ut O. *phyllitidis*, *hirta*, *hirsuta*, *adiantifolia*, *aurita*, *verticillata*. Aliæ venosæ, longitudinaliter rugulosæ s. plicatæ ut in O. *regali*, *claytoniana*, *cinnamomea*, *totta*, *japonica*, *lancea*. Mediantibus his plicis s. striis, loco annuli, ni fallor, capsulæ, elastice dehiscunt, adeoque *annulatis* approximantur. Sic respectu capsularum genera diversa forsan constituunt; priores, charactere sequenti:

Capsulæ subturbinatæ racemo composito insidentes, nudæ, sessiles, superne concentrice striatæ, latere dehiscentes, uniloculares.

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* Vid. Annals of Botany, vol. i. p. 31.

Posteriores:

Capsulæ subglobosæ pedicellatæ, nudæ, in racemo composito s. in dorso frondis dispositæ, plicato-rugulosæ, uniloculares, bivalves.

OSMUNDA *totta.*

Acrostichum barbarum Linn. *Todea bipinnata* Willd.

Ab Osmundis disjungi non meretur, licet plane dorsifera sit, Capsulis e venis dichotomis prorumpentibus demum subconfluentibus Acrostichum referens. Observantur quoque pinnas superiores frondis *Osmundæ regalis* in ramos inferiores racemi rarius abire, capsulis ad margines præcipue onustas.

OSMUNDA *cervina.*

Annulis elasticis hujus capsulæ instruuntur; inter Acrosticha igitur inserenda est; non vero inter Onocleas, utpote indusio carens.

An O. *filiculifolia* et *bipinnata* Linn. revera ejusdem indolis sunt, adhuc in occulto jacet.

LYGODIUM.

Genus ex pristinis Ophioglossis scandentibus concinnatum, cujus species fronde et fructificatione veræ filices sunt, a reliquis Ophioglossis distinctissimæ.

Pauca genera Botanici ævi recentioris tam varie illustrarunt ac idem quod Lygodium mihi audit: a nullo tamen, me judice, hoc genus ex asse designatum est. Cel. Willdenow eo, quod Hydroglossum appellavit, characterem dedit sequentem: "Capsulæ unilaterales subimbricatæ nudæ bivalves." Cl. Bernhardi in duo (perperam vero) dispescit genera, Odontopteridem nempe et Gisopteridem, quibus illam episporangiis carere, hanc vero iisdem præditam esse contendit, quamvis omnes species Lygodii iis instruuntur. Idem genus demum nomine Ugenæ sequentibus notis indicavit Celeb. Cavanilles: "Fructificatio capsularis nuda, dorso radiorum folii adhærens; Spicæ sessiles; Capsulæ

globosæ,

globosæ, duplici serie distiche imbricatæ, foramine dehiscentes verticali amplo. Semina numerosissima, orbiculata, subreniformia, parieti capsulæ affixa." Sic omnes capsulas *nudas* esse statuerunt (præter Cel. Bernhardi ad *Gisopterin* suam), reapse tamen non sunt, sed singulæ intra squamas singulas (episporangia) duplici serie distiche imbricatas concavas s. subcucullatas spicæ insident. Hæ squamæ in spicis vetustis quarundam specierum evanescunt, hinc capsulæ quasi nudæ apparent, quæ tamen basi squamarum superstiti adhærent. Capsulæ proprie bivalves denominari non debent, sed verticaliter et ad alterum latus dehiscunt, striis concentricis (annulo spurio) ut in Schizæa e vertice notatæ.

Lygodia Schizæis valde approximantur; fructificatio utrorumque terminalis s. quasi extra frondem locata; capsulis denique biserialibus sessilibusque oblique dehiscentibus et concentrice striatis. In *Schizæa* tamen capsulæ nudæ sunt, absque squamis Lygodio propriis, quarum loco capsulæ Schizæarum, præcipue juniores, a marginibus appendiculorum parumper inflexis teguntur. Character Lygodii ideo sic reformaretur:

Capsulæ in spicis unilateralibus marginalibus pinnarum frondis, intra singulas squamulas distiche imbricatas, sessiles, solitariæ, uniloculares, apice concentrice striato, latere verticaliter dehiscentes. *Semina* numerosa, subrotunda.

Caulis scandens, flexuosus, *frondesque* conjugatæ, ad habitum totius generis attinet.

Lygodium *scandens*.

Foliis sæpe variat basi auritis; sterilia marginem evidenter, licet subtilissime, serrulatum habent.

Ugena polymorpha Cavanilles, quam pro una eademque specie habet ac *Ophiogloss.* (Lygodium) *scandens* Linn. synonymon diversæ plantæ est s. *Hydroglossi pinnatifidi* Willd. cujus icon in Rheed. *H. Mal.* 12. *t.* 33. exstat;

quodque mihi audit:—*Lygodium pinnatifidum*, caule tereti frondibus pinnatis, pinnis pinnatifidis palmatisve; lobo intermedio longiore.

Filix scandens pulchra brasiliana. Breyn. *Cent.* 185. *t.* 96. a specie ex India orientali indubitanter utut diversa distingui debet, et forte dicenda:

L. *venustum*, caule tereti, frondibus bipinnatifidis, pinnulis lobatis, terminalibus acuminatis serrulatis.

Provenit in America meridionali, Surinamo, Brasilia.

Phyllitidi multifidæ affinis filix scandens. Sloan. H. i. 68. Tab. 46. f. 1. *Osmunda scandens* Aubl. Guian. Insularum Antillicarum præcipue indigena, ab *Ophioglosso scandenti* L. ex India orientali differre videtur, mihique est:

L. *volubile*, caule tereti, frondibus pinnatis, pinnis omnibus oblongo-lanceolatis obtusis serrulatis.

(Descriptio hujus et præcedentis cum cæteris prodibit.)

Figura in Rheed. Mal. 12. 67. t. 34. quam Ugenæ suæ *microphyllæ* attribuit Cel. Cavanilles, synonymon proprii speciei potius videtur quam O. *scandentis*, quocum Cl. Willdenow conjunxit.

Lygodium *flexuosum*, caule angulato, frondibus conjugato-diphyllis, pinnis trifidis palmatis, lobis lanceolatis serrulatis.

Hydroglossum flexuosum Willd., Ugena semihastata Cavanill. ab *Ophiogl. flexuoso* Linn. distinctissima.

Figura *Hort. Mal.* 12. *t.* 32. bona est, et speciminibus quæ possideo perpense assimilatur, specie Linnæana omnino convenientibus. Icon Willdenowii (l. c. tab. i. f. 3.) novam et diversam plantam refert.

O. *circinatum* Burm. a L. *flexuoso* certe distingui debet, ut quoque indicavit Cel. Willden. (l. c. p. 24.) Hujus (nec *flexuosi*) synonymon est Rumph. Amb. 6. t. 33.—*Ugena semihastata* Cav. huc pertinere videtur.

Lygodium *pedatum* potius *longifolium* dicendum, ne cum *Ophioglosso pedato* Burm. confundatur.

Hydroglossum longifolium Willd. *Ugena macrostachya* Cav. l. c. hujus loci sunt.

Frondes ut in reliquis certissime conjugatæ sunt nec ternatæ; dichotome subdividuntur pinnis geminatis. Pinna impar lateri subinde exseritur, hinc frondes quasi ternatæ. (Cfr. Willd. l. c. p. 22.)

LYGODIUM *japonicum*.

Frondes minime alternæ sunt, sed ut in congeneribus conjugatæ; in hoc vero simul supradecompositæ s. tripinnatæ, pinnulis lobatis incisis, quæ sicut pinnæ cæterarum specierum alterne disponuntur.

GLEICHENIA.

Capsulæ minime triloculares, trivalves (Cel. Smith in Act. Taurin.), sed tres s. quatuor distinctæ, contiguæ, subrotundæ s. obovatæ, superne dehiscentes, levissime striatulæ, foveola calyciformi pinnularum fere totam occupante semiinclusæ, sensim elabentes, foveam reliquam apertam marginatam semi- tri- s. 4-locularem, sive dissepimentis 3 s. 4. basi notatam.

ANGIOPTERIS.

Capsulæ subovatæ, nec subglobosæ (Bernh.), uniloculares, duplici serie 5—6 sibi invicem approximatæ, venis frondis transverso parallelis dorso adfixæ insidentes, lineam versus totam marginem (parum tamen remotam) frondis conjunctim formantes, longitudinaliter a vertice ad basin antice dehiscentes (nec rima), lateribus striatis. *Semina* numerosissima, subrotunda.

Synonymon ex Plum. *Fil. tab.* 105. a Cel. Hoffmanno citatum, non hujus sed *Pteridis grandifoliæ* L., cui duas distinctas icones Linnæus ipse adscripsit, nempe Plum. *Plant. Amer. t.* 8. quæ P. *grandifoliam* exhibet et *Hist. Filic.* ejusd. T. 106. Asplenii s. potius Diplazii novam speciem referens.

DANÆA.

Character genericus hujus simul ac Gleicheniæ in *Act. Taurinens.* a Cel. Smith. divulgatus, scil. *Capsulæ* uniloculares extus poro dehiscentes, duplici serie aggregatæ, ab Angiopteridis non abhorret (quoad descriptionem, non figuram). Capsulæ Danææ oblongo-lineares sunt, frondique immersæ, inter costam et marginem transverse parallelæ venis insidentes, multiloculares: *loculis* duplici serie superne dehiscentibus.

Hunc characterem impertivit *Danæa nodosa* (Asplenium nodosum Linn.)

MARATTIA.

Differt a Danæa capsulis ovalibus punctorum instar in pagina frondis *sparsis*, bipartibilibus; nec ut in Danæa linearibus parallelis.

PSILOTUM, BOTRYCHIUM, OPHIOGLOSSUM et LYCOPODIUM affinitate summa Filicibus approximantur, sed sicut Musci discedunt *vernatione non circinali.*

BOTRYCHIUM.

Capsulis adnatis avenulosis, substantia crassiori subcoriacea, ad partem dehiscentibus sive hiantibus, nec bivalvibus ab Osmundis diversum genus. "Est more animalium viviparum. Si nempe caulis pone radicem, ubi cavus est, longitudinaliter dissecatur, invenitur ibi parvula planta, quæ omnibus suis partibus majori similis." *Flor. Suec.* —. Sic B. *Lunaria* sese habet, cui cæteræ species forsan assimilantur.

OPHIOGLOSSUM.

Hoc et *Botrychium* structura et habitu parum inter se differunt, distincta tamen contra sententiam Cl. Wood-

wardi

wardi (apud Withering *Arrang*. 3. *p*. 762.) constituunt genera, indicante *fructificatione* prioris articulato-spicata ex capsulis distiche connatis transverse dehiscentibus.

OPHIOGLOSSUM *lusitanicum*.

Folia gerit caulina et radicalia simul, omnino lanceolata.

OPHIOGLOSSUM *capense*.

O. *lusitanicum* Thunb. Prodr. Fl. Cap.

Folia subradicalia solitaria. Forma horum reapse ovata, a præcedente diversum.

LYCOPODIUM.

Ratione inflorescentiæ s. insertionis capsularum genus certe non dilacerandum. Dantur enim species, quarum spicæ a caulibus vix s. minime distinctæ sunt, squamis capsulas interstinguentibus quoad figuram foliorum simillimis (L. *alopecuroides*, *inundatum*, *rupestre*, *sanguinolentum*.). In L. *apodo*, *denticulato* et *helvetico* vascula fructificantia duplicis formæ reperiuntur, quorum alia terminalia subspicata, alia inferiora s. proprie axillaria sunt. Hoc ansam præbuit conjecturæ, Lycopodia quædam sexibus distinctis gaudere et ad Monoeciam plane reducenda esse, de quo Cl. Fel. Avellar Brotero in *Act. Soc. Linn. Lond.* 5. *p*. 162. seq. docte disseruit. Sed in omnibus aliis speciebus aliquid ejusdem naturæ adhucdum latet, quod dies forsan revelabit.

Delineatio Tabularum.

Tab. IX.

Fig. 1. *Pteris thalictroides*. (Acrostichum L.): particula frondis magnitudine aucta. *a*. Capsula seorsim clausa. *b*. Annulus, oculo armato valde auctus.

Fig. 2. *Onoclea sensibilis* L. *a*. Spica mag. nat. *b*. Pinna in globum contracta, aucta. *c*. Pinna adulta rumpens. *d*. Eadem

d. Eadem explicata, receptaculis caps. venis insertis. *e.* Vena seorsim receptaculis. *f.* Capsula. *g.* Eadem annulo antice spectante, valde auctæ.

Fig. 3. *Osmundæ adiantifoliæ* s. *hirtæ* L. spica capsulis onusta, aucta. *a.* Capsula mag. nat. *b. c. d.* Capsula vertice concentrice striato, latere, dorso, et antice visa, valde aucta.

Fig. 4. *Osmunda regalis* L. Pinna superior frondis in racemulum abiens mag. nat. *a.* Caps. mag. nat. *b.* Capsula rugis s. striis longitudinalibus. *c.* Eadem aperta, magn. aucta.

Fig. 5. *Osmunda totta* (Acrostichum barbarum L.). *a.* Pinna fructificans mag. nat. *b.* Capsula. *c.* Antice visa et aperta. *d.* Dorso spectata, magnifacta ope lentis.

Fig. 6. *Polypodium glaucum.* *a. b.* Capsula valde aucta, annulo spurio.

Fig. 7. *Polypodium dichotomum.* *a. b.* Capsula longitudinaliter striata.

Fig. 8. *Polypodium furcatum.* *a.* Capsula clausa. *b. c.* aperta annulo elastico, magn. aucta.

Fig. 9. *Osmunda turrifraga.* *a.* Capsula clausa. *b.* Eadem aperta, magn. aucta.

Fig. 10. *Osmunda cervina* L. Acrostichi species. Capsula annulo elastico, magn. auct.

Tab X.

I. *Schizæa.* *a.* Appendiculi s. spicilli *Schiz. elegantis* magn. nat. *b.* Particulæ magn. auct. *c.* Capsula antice visa, dehiscens; *d.* Eadem dorso microscopio visa.

II. *Lygodium.* *a.* Spica *Lyg. scandentis* s. *flexuosi* antice visa, aucta. *b.* postice. *c.* Particula spicæ, grandifacta, *aa.* Capsulis elapsis. *bb.* Capsulis verticaliter dehiscentibus. *c c.* clausis. *d.* Capsula clausa. *e.* Eadem

e. Eadem situ solito aperta. *f*. Eadem antice visa. *g*. Forma seminum.

III. *Gleichenia*. *a*. *Gleich. polypodioidis* pinna, magn. nat. *b*. Eadem multoties aucta. *c*. Pinnula seorsim valde aucta, foveolam ostendens capsulis tribus immersis. *d*. Eadem, capsulis elapsis, fundo 3-loculari. *e*. Capsula latere, *f*. antice visa. *g*. Semina.

IV. *Angiopteris evecta*.—*a*. Particula pinnæ aucta. *b*. Capsula antice spectata, dehiscens. *c*. dorso visa.

V. *Danæa*. *a*. *Dan. nodosæ* pinna fructificans magn. nat. *b*. Pars ejusdem capsulis immersis. * Fovea pro capsula elapsa. *c*. Capsula seorsim superne visa, *d*. subtus spectata. *e*. eadem transverse secta loculos ostendens. *f*. Semina.

VI. *Marattia*. *a*. *Marat. alatæ* pinna, mag. nat. *b*. Eadem magnifacta. *c*. Capsula clausa. *d*. Eadem aperta, superne bipartibilis. *e*. Eadem sectione transversali loculos exhibens, ope lentis aucta.

XXII. *Observations on the Genus Ficus, with the Description of some new Species. By Prof.* C. L. WILLDENOW*.

OF all the vegetables that we know, none exhibits more remarkable characters than the Fig-tree. What is in common language called its fruit, presents such very great anomalies in its structure, that there are but few objects in nature to which it can properly be compared. Indeed, even those who, through want of a preliminary knowledge in botany, do not discover any thing singular on dissecting that part, must be surprised to learn in what manner the fig is produced by nature. Without being preceded by any flower, it appears on the stem of the tree, is gradually developed, and insensibly arrives at maturity. This mode of fructification must have been striking to observers, even in remote ages, when men, so far from founding systems of botany on the sexual organs of plants, had only the vague ideas of poets on the subject of vegetable generation. The flower of the fig-tree was long searched for in vain, till at last Valerius Cordus, more than two centuries ago, solved the problem by discovering that part within the fig itself; but this discovery cannot be considered as a proof that this botanist had any intimate knowledge of the nature and destination of the essential organs of the flower. It is indeed surprising that even the antient botanists should not have been led to the investigation of the flower of the fig-tree by their acquaintance with the process of caprification; and that this process, together with the one required for the cultivation of the date, should not have revealed to them the mystery of the fecundation of plants by means of their sexual organs. Pliny gives an account of the caprification, such as it is still practised in our days in the islands of the Archipelago, and explains it in his manner, according to the imperfect physical notions of his age.

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* Memoirs of the Royal Academy of Berlin, 1801. p. 91.

The caprification is, as is well known, an artificial fecundation of the fig-tree, still made use of by the Greek peasants to ensure an abundant harvest of fruit. For this purpose they repair in the months of June and July to a place where the male tree, called *Caprificus* by Pliny, grows wild; and having gathered the figs which it produces, but which never ripen, they suspend them on the branches of the female trees, called *Ficus sativa* by Pliny, and in doing this they take care to place the wild figs in the neighbourhood of the bunches of figs already formed on the cultivated tree. There may now be seen coming out of the male fig a great number of small winged insects, classed by entomologists with the Cynips, which immediately insinuate

sinuate themselves into the female figs, and thus impregnate the fruit. The Greek cultivators, according to Tournefort, take the greatest pains to assist this operation: during the space of two months they every morning convey the insects from one tree to another, well knowing that, although the work is troublesome, it affords the means of making a good healthy tree produce as much as 280 pounds weight of figs, whereas, without it, all the figs would fall off before they arrived at maturity.

Pliny, who was acquainted both with this caprification, and the fecundation of the date, as still practised in Egypt, supposes that the insect is produced by the fermentation of the juices of the male fig, and that it perforates the female ones in order to find nourishment in them—an explication which rests on equivocal generation, exploded ever since experiments have proved it to be utterly inadmissible. The Roman naturalist, however, was far from suspecting the fecundation of the female organ. Even the celebrated Tournefort, without whose labours the great Swedish reformer could not have acquired such a high degree of knowledge, was so ignorant of the generation of plants as to imagine the pollen to be an excrementitious matter: it is not surprising, therefore, that his opinion respecting caprification should not greatly differ from that of Pliny. He supposes that the extravasation of the nutritious juices, in the cultivated figs, by the puncture of the insects coming out of the male fig, favours their ripening, and that the fluid deposited by them in the fruit may tend to the same purpose by exciting a fermentation in it. This hypothesis he supports by observing that in Provence, and in the botanic garden of Paris, they attain the same end by pricking the figs with a straw or pointed quill dipped in olive-oil. But the French naturalist was inattentive to the very important circumstance, that the fig-tree commonly known and cultivated in our gardens never produces any perfect seeds.

Besides,

Besides, it is universally known that in all organized bodies, whether animal or vegetable, the application of a stimulus to any part will occasion an afflux of the juices: hence melons, and other fruit of our gardens, will acquire sooner and more perfectly the saccharine taste of ripeness if pricked with a pointed instrument, as do the plums, pears, &c. which contain the larvas of insects commonly called maggots; but the caprification of the fig-tree affords phænomena far different from these.

There are three modifications with regard to sex in the common fig-tree. In the climates where it grows spontaneously, there occur male trees, the figs of which fall off when developed to a certain point, without ever becoming succulent enough to serve for nourishment. In the next place there are trees of taller growth, producing figs more abundantly, but which do not become perfectly developed unless there be some male tree near them; these are the female fig-trees. Lastly, there are trees smaller than the others, which produce figs susceptible of maturity without the presence of another tree, both the male and female organs being united on the same individual. This hermaphrodite variety is also cultivated in our gardens, and grows spontaneously in Spain, Italy, Istria, Dalmatia, and the southern provinces of the Turkish empire; but is scarce in the Greek islands, and in the temperate climates of Asia, where that with the male and female sexes on distinct trees is much more frequent. Such an hermaphrodite variety, among dioicous plants, is not very uncommon; we see many other analogous instances, of which it will be here sufficient to mention the Carob tree (*Ceratonia Siliqua*). It may be observed in general that the climate has the greatest influence on the sexes of the plants; the varieties thus produced often escape our attention, only because the plants so modified do not become interesting to the cultivator, on account of the quality of the fruit they produce.

The fig-trees of our gardens usually bear none but female flowers; it is extremely uncommon to meet with the male and female within the same fig. Being thus in want both of the male tree and the insects destined to assist in the fecundation, it is not to be expected that our figs should produce seed fit for germination: nevertheless they do arrive at a certain degree of maturity, and yield a juicy nourishment, although much inferior in quality to the oriental figs. The Greeks would have less labour with their fig plantations did they cultivate only the hermaphrodite variety which also occurs in our gardens; but then this tree is constantly of smaller growth, and never yields more than five-and-twenty pounds weight of figs.

On opening a fig before it has arrived at maturity, we find a fleshy substance with its inner surface covered all over by small floscules, in which the sexual organs may easily be discerned. The fig, therefore, according to scientific terminology, is not a fruit, but only a receptacle. Numerous and varied experiments have taught us, that fecundation can be effected in few flowers without the aid of insects, especially in those species where the different sexes are found on distinct individuals. We likewise know that many plants, the flowers of which deviate much from the usual form, are destined to be fecundated by certain insects that nature has associated with them for this purpose. Thus it happens that many of the exotic plants cultivated in our gardens, do not perfect their seeds—for no other reason than because, in transplanting them into our climates, we have not at the same time introduced a colony of insects peculiar to them. Such is the case of the fig-trees with separate sexes, which require for their fecundation the presence of a certain winged insect; for, as soon as the fig of the male tree is sufficiently expanded, a small opening appears at the extremity, which the insect is ready to enter at, not indeed with the design to assist in the impregnation,

pregnation, but allured by the sweet and nourishing juice of the small flowers contained in the fig. These insects, therefore, are not engendered within the male fig, as was the opinion of Pliny and Tournefort, but enter from without to seek their nourishment.

In the season of flowering there is an opening at the upper extremity of the fig of the female, or cultivated tree, as well as of the male, sufficiently large to admit of free ingress and egress to these small insects, which, after having ranged over the flowers, deposit their eggs in the pulp. These eggs produce larvas (maggots) that feed upon the fleshy part of the fig, and are afterwards transformed into the perfect insects. The gathering of the figs, however, begins before the larvas are developed, and the fruit is dried in the oven. As for the larvas deposited in the male figs they may arrive at their full growth, pass into the chrysalis state, and the next year into perfect insects. It is interesting to observe how nature has united the propagation of this vegetable with the existence of a feeble insect; it affords an admirable instance, among a thousand others, of the universal harmony that pervades all animated nature, producing general good out of apparent disorder.

Modern botanists have observed, that in the East and in Barbary the caprification is practised in some districts, while it is utterly neglected in others, which nevertheless enjoy most abundant harvests of figs; and they have thence endeavoured to prove that the operation is entirely superfluous. But while it is possible that in those countries where the fig-tree grows spontaneously the caprification may be dispensed with, yet, on the other hand, we may be sure that in places where there are no wild trees near, it must be very essential. The antients were convinced of its necessity from real experience, and were not led to adopt the practice by conclusions drawn from any principles of botany. Yet even in those countries where no wild trees are found, the figs may doubtless arrive at a degree of maturity without caprification: but then they remain small, and their seeds steril, as, for want of fecundation, the receptacle of the flowers and germens, which properly constitutes the fig, increases in size without any evolution of the germen itself.

Singular as the structure of the fig may appear, it is not difficult to trace a gradual transition towards it when we compare it with that of the flowers of several other vegetables; for nature seems to have followed a regular type in the organization of plants, the same organs occurring in all, though their forms are varied in an imperceptible gradation. The fig, as has been shown, is a hollow pear-shaped receptacle, containing the flowers arranged on its inner surface. If we begin to compare it with the flowers of the cherry-tree, we find that in these, as having a single style only, the receptacle is but of little bulk, so that at the time of the maturity of the cherry, instead of the receptacle we see only the expanded extremity of the peduncle; but where several pistils are to be lodged, it becomes necessary that the base on which they stand should be more extended than in flowers having only one pistil; and so we find it, except in Anacardium, Semecarpus, Hovenia, and perhaps in some other plants. In the strawberry there are a greater number of pistils than could be placed on a narrow base; the receptacle is consequently increased, acquiring so considerable a bulk that, in common language, it is spoken of as the fruit itself. We consider this as the first case of an amplification of the receptacle, which becomes more striking in those plants where several flowers, having a common calyx, are attached to the same base, and which by the older botanists were called *Flores aggregati*, such as Dipsacus, Scabiosa, Globularia, Protea, Banksia, &c. Still more obvious is it in the plants belonging to the Linnean class Syngenesia, formerly called *Flores compositi*; the most striking instance of which occurs in Helianthus, bearing on a circular disk a great number of flowers. From Syngenesia we proceed to vegetables that bear a great number of flowers on the flat and very much extended surface of their receptacle, such as Dorstenia, of which there are several species in the southern parts of North America. In this singular genus the flowers are not merely seated upon the thick and fleshy receptacle, as in the compound flowers, but are imbedded in the substance of the receptacle itself, so that only their summits appear. It is impossible to overlook the resemblance that this insertion bears to that of the fig, except that in Dorstenia the receptacle is always flat and salver-shaped.

But there is another plant, the inflorescence of which, in regard to the receptacle, approaches still nearer to that of the fig-tree, viz. Mithridatea: of this genus only one species is known, M. quadrifida, a native of Madagascar, and well described by Sonnerat in his account of that island. From the use to which its wood is applied by the Indians, it has obtained the name of *arbre à tambour*, the drum-tree. The flowers of this plant are, as in Dorstenia, deeply imbedded in the substance of a fleshy receptacle; but what approximates this structure still more to that of the fig is, that until the flowers are developed the receptacle remains closed; but when the season of inflorescence is arrived, it opens in four parts, displaying the appearance of a four-cleft flower. This connection of Ficus with Dorstenia, by means of Mithridatea, is very striking, although the receptacle of the latter is not eatable; for this property is not at all essential to Ficus, the greater part of the species of which do not produce figs fit for nourishment. If we take a different view, and consider every receptacle bearing a number of flowers, as formed by the union of the several flower or fruit-stalks into one mass, we shall then perceive an affinity with the structure of the f[illegible] called Hovenia dulcis by

Thunberg; for the stalks of its flowers, taking on a round form, swell and become fleshy after the flowering is over, and have the taste of Borstorf apples, whereas the fruit itself is a sour capsule unfit to eat*.

The fig-tree having been known from time immemorial, one would imagine its fructification, lodged in the interior of the receptacle called the fig, must have been long ago perfectly well known and characterized by botanists: nevertheless, upon comparing the descriptions given of it by different botanical writers, we find so much contradiction that he who has not studied the subject for himself, will be at a loss what idea to form of it. Linnæus says:

Receptaculum commune turbinatum carnosum connivens occultans flosculos, vel in eodem vel in distincto.—*Flos masculus:* Calyx tripartitus, corolla nulla, stamina tria.—*Flos fœmineus:* Calyx quinquepartitus, corolla nulla, pistillum unicum, semen unicum.

Scopoli, in his *Deliciæ Floræ et Faunæ Insubricæ*, *vol. iii. p.* 70. agrees with Linnæus in regard to the receptacle, but gives quite a different description of the flower and fruit. He says:

Flos masculus: Calyx quinquefidus, corolla nulla, stamina 2—7, filamentum singulum apice sustinens antheras duas distinctas, ovatas, biloculares.—*Flos fœmineus:* Calyx quadrifidus, corolla nulla, pistillum unicum, bacca monosperma.

Gærtner in his invaluable work *de Fructibus et Seminibus Plantarum*, *vol. ii. p.* 66. has preserved the characters of the receptacle and flower as given by Linnæus; but of the fruit he says, that it is a *Drupa monosperma.* In the same volume, however (p. 484.), he changes his mind, and says in his description of *Ficus religiosa:* Etiam in hac specie pericarpium proprium est mera pellucida pulpa per maturitatem exarescens et semen arcte claudens, hinc omnino Drupæ nomen in caractere Ficus Caricæ expungendum et ejus loco utriculus pulposus ponendus.

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* None of the above plants seem to us to show the least affinity to Ficus, except Dorstenia and Mithridatea.—Ed.

Thus we see that the flower of the fig produces, according to Linnæus, a naked seed; according to Scopoli a one-seeded berry; and to Gærtner a one-seeded drupe, though afterwards he makes of it a succulent membranous pericarp. As for the difference that exists in the descriptions of the flower as given by Linnæus and Scopoli, we need not pay any attention to it, since we know how much the number of parts is subject to vary in cultivated plants; but the characters attributed to the fruit by those two botanists, are too essentially different to be reconciled. According to the repeated examinations to which I subjected those organs, it appears to me that the description given by Linnæus approaches nearest to the truth; both the male and female flowers are supported by a short thread-like pedicle, as has been observed by most botanists. The germen of the female flower, which afterwards becomes the seed, is surrounded by the calyx, which closes after the flowering is over, becomes rather more fleshy, and covers the seed till it arrive at complete maturity, giving the appearance of a berry. The character of the fruit may therefore be thus given: Semen unicum, calyce persistente succulento clauso tectum.

The genus Ficus has been successively placed by Linnæus in two classes of his system: he first referred it to the last, Cryptogamia, and afterwards, following the advice of Baron Münchhausen, arranged it with the twenty-third class, Polygamia, where, with Ceratonia, it constituted a separate order, called Triœcia. Chevalier Thunberg, who endeavoured to render the Linnean system more perfect by omitting the four concluding classes except the last, removed the fig-tree into the third class, Triandria, from the number of its stamens. Professor Swartz, in his Prodromus Floræ Indiæ Occidentalis, has restored it to the class

Cryptogamia. But it seems to me impossible to arrange Ficus in this class, the structure of its flowers being entirely analogous to that of other vegetables, notwithstanding the sexual organs are concealed from the eye by the surrounding receptacle. Besides, the fig exhibits a mode of germination and growth entirely distinct from that of the cryptogamous plants, which all agree in that respect, however dissimilar they may be in others.

Linnæus blames Ray for having created a new class to receive the fig-tree, though he himself devotes to it a distinct order of the class Polygamia, to which, not to let the fig stand quite insulated, he added the genus Ceratonia. This is not the place to assign the reasons why this class should be entirely abolished; but I cannot avoid remarking that the order *Triœcia* conveys no determinate idea, and is in itself very superfluous. This observation is of some moment, as several polygamous plants offer just the same sexual difference. It is not unfrequent in our climates to find maple trees of the common species, of which one individual bears hermaphrodite, another only male flowers, while a third produces nothing but female ones. The ash and several other vegetables offer the same phænomenon; from whence it follows, that if the class Polygamia be retained, either a greater number of plants should be added to the order Triœcia, or this order should be entirely cancelled, and so much the more as the word Polygamia appears tacitly to imply the triœcious character. If, therefore, Ficus is to be continued with the polygamous plants, it should be placed in the order Diœcia.

The known species of Ficus are very numerous, and the recent voyages to distant parts of the world have considerably added to their number. Linnæus, in the last editions of his System, published by himself, enumerates twelve species; to these his son added five; and Thunberg, in a dissertation, in form of a thesis, defended under his presidency at Upsal in 1786, describes twenty-seven. At present the number exceeds forty; to which I shall here add three new ones, giving the characters in the language of botanists.

FICUS SCABRA.

FICUS foliis subrotundo-ellipticis dentatis acuminatis scaberrimis.

Rami teretes, striati, scabri, a casu foliorum cicatrisati.

Folia alterna, petiolata, subrotundo-elliptica, basi attenuata integerrima, apice acuminata margine inæqualiter dentata, venosa, utrinque punctis prominulis scaberrima.

This new species is a native of Guinea. Its leaves are so rough, that they may, as well as Equisetum fluviatile and some other plants, be employed for giving polish to wood. The fig I have not yet examined.

FICUS PARASITICA. Tab. xi.

FICUS foliis ellipticis obtusiusculis integerrimis subtus reticulatis scabriusculis, pedunculis geminatis, receptaculis globosis umbilicatis.

Rami teretes, læves, cortice albicante tecti.

Folia alterna, petiolata, elliptica, basi et apice parum attenuata, obtusiuscula, margine integerrima, coriacea, reticulato-venosa præsertim subtus, superne nitide glabra, inferne scabriuscula.

Pedunculi axillares, geminati.

Receptacula globosa, magnitudine pisi, umbilicata.

This fig-tree is found in the East Indies in the shape of a small shrub; it is sometimes seen growing upon old trees, whence its name is derived. Its fruit is not eatable.

FICUS CALLOSA.

FICUS foliis oblongis obtusis basi angustatis integerrimis subtus scabris, receptaculis umbilicatis.

Rami teretes, fusci, a foliorum casu cicatrisati.

Folia alterna, petiolata, oblonga, obtusa, basi parum angustata punctisque binis callosis superne instructa, margine integerrima, venosa, superne atro-viridia nitida glabra, inferne pallidiora scabra.

Receptacula globosa, magnitudine cerasi, umbilicata.

Also a native of the East Indies. It comes very near Ficus lucida, but is distinct from it in its leaves, which are smaller, more coriaceous, hispid on the lower surface, tapering towards the base, where they are marked with two very small cartilaginous points. It does not appear that its fruit is used for food.

FICUS MOLLIS. Tab. xii.

FICUS foliis oblongis integerrimis supra scabriusculis, subtus villoso-mollibus, receptaculis lateralibus globosis umbilicatis sessilibus pubescentibus.

FICUS *mollis* foliis oblongis integerrimis subtus villosis, fructibus axillaribus sessilibus tomentosis. *Vahl. Symb. vol. i. p.* 82.

Rami teretes, pallide fusci, juniores pubescentes, subtomentosi.

Folia opposita, petiolata, oblonga, tripollicaria, acuta, integerrima, superne nitida scabriuscula, inferne reticulato-venosa, villoso-hirta, mollia.

Petioli semi-teretes, semipollicares, pubescentes.

Receptacula lateralia, aggregata, sessilia, globosa, umbilicata, pubescentia.

This species is distinct from all the rest, especially in its leaves being opposite, while those of the others are alternate. I cannot positively decide whether the plant described by Professor Vahl be exactly the same with this, for he has not made any mention either of the opposite position of the leaves or of their hairy surface.

I have no doubt but that in the tropical climates there are still many species of Ficus to be found. In these countries they occur only in the swamps or on mountains. Though the fig-trees are almost all natives of hot climates, yet several of them present there the interesting singularity of their leaves being deciduous: in their native country they shed their leaves at the approach of the rainy season. It is from this circumstance that Rumpf has given to a species of Ficus the name of the Dead-tree.

Some of the species distinguish themselves by the property of sending forth from the extremities of their branches new roots, which strike into the ground, and thus produce new individuals.

XXIII. *Account of the Rasamala, or Tree which yields the true liquid Storax, belonging to the Natural Order of Coniferæ.*

In our review of Lambert's work on the genus Pinus, we promised to say more at a future opportunity of another interesting coniferous tree, with broad leaves, called the *Rasamala* or *Lignum Papuanum* by Rumpf, at that time suspected by us to be a congener of the remarkable *Pinus Dammara* of the above work; but we now find that it must constitute a separate genus in the natural order of the Coniferæ, as will appear from the following ample account of Dr. Noroña*, taken from the fifth volume of the Transactions of the Batavian Society of Arts and Sciences, a work which, being published at Batavia, and written in the Dutch language, can scarcely be presumed to be in the possession of many of our readers.

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* We learn from the introduction to the fifth volume of the Batavian Transactions, that this Dr. Noroña was a Spanish naturalist, who, chiefly with a view to botany, undertook a voyage to the Manillas, where he collected a great number of plants. From thence he went to Java, where he obtained permission from the Governor-general Alting to proceed to the interior of the island; which favour he thought himself under the obligation of rewarding, by naming the above tree *Altingia excelsa.* He also communicated a description of the Rangas, a species of Anacardium, and a considerable list, in Latin and Javanese, of both new and known genera and species

The *Rasamala* is a lofty tree, rising with majestic upright growth to the height of two hundred feet and upwards. Its vast roots, that penetrate deep into the ground, are covered with a thick, aromatic, red bark, which diffuses a pleasant perfume like that of Storax; but the woody part of these roots has a still more grateful fragrance, which may be compared to the mixed odour of Narcissus and Benzoin.

The stem just above the ground is from twenty-four to thirty feet thick, but is at this part split into four or five parts, forming as many excavations[*]; above this the trunk is perfectly round, and of an even surface. The bark is partly smooth, partly warty, of a bitter balsamic taste, ash-coloured on the outside, and of a dark red hue within, where it is lined with a pale red liber of an aromatic smell, though less so than that of the root. The wood is likewise reddish, compact, of considerable specific gravity, and replete with a resinous aromatic oil, which either flows out spontaneously through the fissures in the bark, or artifi-

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species of plants collected there, under the title—*Relatio plantarum Javanensium iterfactione usque in Bandom recognitarum a Dno. F. Norona.* Intending to return to his native country, and to give the results of his researches to the botanical world, he set sail for the Isle of France, where he arrived, but unfortunately died soon after.

[*] In hot climates several of the larger kinds of trees have their real trunks supported upon a sort of large buttresses, which in Cupressus disticha are, according to Bartram, of such prodigious size, and project to so great a distance, that several men might easily hide themselves in the hollows between: the same is the case with Ficus religiosa, Canarium, &c. As each of these buttresses terminates below in a large root, they may be considered rather as roots above ground than any part of the trunk. It is probable that the author means to describe here some such structure, otherwise the immense size of the stem would be hardly credible.

cially through incisions made by the Javanese, who esteem this drug much, both as a scent and as an external application in diseases. It has at first the colour and consistence of honey, but soon after becomes rather whitish and transparent like crystal.

A great part of the trunk is occupied by parasitical Ferns and Epidendra, all flourishing in the most lively green, from the abundance of juices ready prepared for their nourishment. The head of the tree consists of a number of rather upright branches, about the thickness of a man's thigh, and disposed in a circle; these are subdivided into smaller ones, that are round, very smooth, covered with a thin reddish bark, diffusing an agreeable odour when broken.

Its leaves are alternate, oblong-egg-shaped, widened in the middle, and lengthened into an acute point, sawed at the edges, coriaceous, soft and pliant, smooth and glossy, veined, rather wrinkled, varying in size, the largest four inches and a half long, and nearly two wide, of a light green colour on the upper, and glaucous on the under surface, petioled: petioles round or semicylindrical, rather channelled, eight lines in length, exuding in drops, when plucked off, a resinous juice of the consistence of honey, smelling like the true Storax. Stipules very short, of a brown colour. The taste of the leaves is balsamic and astringent. Whilst entire they are without scent, but when rubbed between the fingers diffuse an odour like that of the resin of the stem; still more agreeable when the leaves are dried, in which state they are kept in trunks and drawers for the sake of perfuming the linen and other wearing apparel.

The flowering season of the Rasamala is in the months of September, October, and November, at which time there appear, at the extremities of the uppermost branches, peduncles three or four inches long, bearing the aments in groups of two, three, or more, the male and female on distinct peduncles.

The male aments are top-shaped, an inch in length, and the size of the finger, composed of many tiled, nail-shaped, leathery scales, about six lines in both diameters, and of a greenish-yellow colour: each of these aments contains eight or ten globular or rather pear-shaped flowers, each consisting of four short, leathery, yellowish scales, from the centre of which grows a top-shaped column, four or five lines long, beset round with many stamens (from 60 to 100); filaments short, capillary, of a brown colour; anthers top-shaped, contracted below, dilated and flattened upwards, somewhat bifid, of a yellow colour, filled with the most minute sulphur-coloured globular pollen, which explodes at the time the two valves of the anthers open.

The female aments, which are on different branchlets, beneath the male ones, are roundish, and contain from twelve to twenty flowers each. Each of the hard woody scales, which may be considered as the calyx, incloses two ovaries, with incurved, channelled, brown styles, scarcely two lines long, terminating in simple, conical, hollow stigmas.

The male flowers dry and drop off immediately after fecundation; but the female ones increase, their scales approach each other, and, growing together, form a hard and compact roundish cone, of a brownish colour, the size of a walnut. Each of the scales includes two hard, oblong, wedge-shaped, cartilaginous seeds of a green brown colour, the size of a horsebean, and dividing into two halves: their external covering is composed of a mass of small, yellowish, angular, shining, ligneous grains; the kernel itself is reddish, compressed, and almond-like, surrounded by a very delicate cuticle; its substance is white, fleshy, tender, of a pleasant, sweetish taste. This kernel is divisible into two equal parts, which are the cotyledons, both of an ovate form, and furnished with a round descendent radicle. The grains that compose the outer integument of the seeds, diffuse a grateful smell, similar to that of the resin, but have an unpleasant oily taste.

This tree is called *Rasamala*, both by the Malays and Javanese. It is found in the greatest abundance on the hills and in the woods of Adjar Thomas, and near the place called Chiapannas, where it fills the surrounding atmosphere with its delightful fragrance.

In the Linnean system, the Rasamala is to be referred, with the common pines, to Monœcia Monadelphia. Rumpf, in his Herbarium Amboinense, vol. 2. p. 57. makes mention of the *Lignum Papuanum*, or *Casa Rasamala*, but, not having himself seen the tree, gives neither description nor figure of it. According to him it grows in the island of Papua, or New Guinea; and the wood, he says, is brought to Java from Ceylon and the Malabar coast: but the truth is that this tree is by no means found either in Ceylon or Malabar, but in Java, the country of the Papuans, Cochinchina, and in some islands of the Red Sea. Rumpf adds that no resin flows out of the tree spontaneously, and that the wood is scentless; but this author has without doubt been deceived by incorrect information.

Geoffroy, in his *Materia Medica*, asserts, on the authority of James Petiver, in the Philosophical Transactions (No. 313.), that the liquid Storax, called Cotter-Misa by the Turks and Arabs, is the product of a certain tree called Rosa-mallos, which grows in the island Cobros, in the Red Sea, three days' sail from Suez. Prior to this suggestion the tree that yields the true liquid Storax was entirely unknown to naturalists; and the investigation of M. Noroña proves beyond a doubt that Petiver was completely in the right.

The name by which the resin of this tree is known to different nations is nearly the same; the Arabs call it *Rasem-*

Rasem-malla, the Papuans *Russimal*, the Cochinchinese *Roza-malla*; but with the Persians it goes by the name of *Miha*. Almost all the parts of the tree yield it, but not equally pure; the Arabs, however, depurate and refine it, and in this condition it is sent from Mocha and Ispahan to Europe. The Javanese do not understand how to depurate this resinous juice, though there is no question that, if it should ever become an article of trade, the labour bestowed on the process would be profitably repaid to the inhabitants of that island, which produces a greater abundance of Rasamala trees than any other part of Asia.

The medicinal virtue of this tree is antiseptic and abstersive: a decoction of the leaves is used in cases of contusions, violent falls, malignant fevers, and indeed wherever a putrid disposition of the fluids prevails. The resin is held in high estimation with all the oriental nations, especially with the women, who know how to make all sorts of perfumes, in which the Rasamala is constantly the principal ingredient. It is also administered internally in doses of from three to twelve or more drops, as a remedy against putrid and scorbutic ulcers.

The wood of the Rasamala is also considered as a very useful timber, on account of its great solidity and hardness, joined to the agreeable perfume it diffuses.

Upon almost all these trees is found a peculiar kind of Scarabæus, called Cacalum by the Javanese, that lives entirely upon the Storax, and smells very strong of it; whence M. Noroña has given it the name of *Capricornus Styracinus*.

REVIEW.

XXIV. S. E. BRIDEL.—*Muscologia Recentiorum, s. Analysis, historia et descriptio methodica omnium muscorum frondosorum hucusque cognitorum ad normam Hedwigii.* Tom. ii. Pars iii. Gothæ, 1803. 4to.

IN the retrospect of botanical literature, given in the first number of the Annals, some notice was taken of the volume now before us, which had then made its appearance on the continent, though it was not till very lately that a copy found its way into England. We had expected, in conformity with the original intention and proposal of the author, that this part would not only have terminated the remaining Genera of Mosses, but also been supplementary to the whole; amending the errors, filling up the omissions, correcting the synonyms, and adding whatever had been discovered subsequently to the appearance of the preceding volumes. In this expectation, however, we have found ourselves disappointed; for Mr. Bridel here attempts nothing more than the describing of the species of the eleven last genera, reserving every thing further to some future, and, we are sorry to say, indefinite period.

In the present advanced state of botanical literature, a general Muscologia is unquestionably a great desideratum; but whether Mr. Bridel be the naturalist from whose hands the votaries of this science would be most desirous of receiving one, is a question that, we must confess, appears to us to admit of some doubt. Dr. Hedwig's Stirpes Cryptogamicæ, as far as they extend, may certainly be considered as a publication which neither has been, nor is likely to be, rivalled: upon his Species Muscorum, as a work avowedly unfinished and incomplete, it might not be candid to employ the common strictness of criticism; but neither of these, however excellent, is by any means sufficient to initiate a botanist in the knowledge of the mosses; and we believe we are correct in stating that every other work which has treated of this tribe, treats of it only with reference to the productions of some single country, or in common with other vegetables. The present publication, therefore, is unquestionably of such a nature as, if well executed, would be highly useful. Against the execution of it, indeed, in a masterly manner, there are so many accumulated obstacles, that we very much doubt whether any botanist, even Professor Swartz, who has bestowed so many years upon the investigation of these plants, be fully equal to the attempt. At the same time, however, that we say this, we beg to be understood that, though we despair of seeing a perfect Historia Muscorum in our days, we should be very happy to announce one as free from error as our present limited acquaintance with the subject allows us room to expect, and we heartily wish we could with truth say that this is the case with the one before us; the author of which, we are apprehensive, undertook the task before he had well consulted the strength of his own shoulders, or, more properly speaking, before he had allowed himself sufficient time to make himself master of the subject. Hence the frequent complaint among the botanists of the continent, that, in his eagerness to collect all that has been said upon the mosses, his compilations are frequently wanting in judgment; and hence, what occurs more than once in his preceding volumes, the repetition of the same species under different names, and perhaps different genera.

He has endeavoured also to introduce a complete synonymy, which every person who has bestowed the least attention upon the matter must know to be utterly impracticable;

and

and in this attempt his frequent errors, which were entirely unavoidable, have given to the whole work a character of inaccuracy, which, in our opinion, it by no means deserves to the extent it has received. We certainly wish that he had aimed at less, or that, having attempted so much, he had taken steps so to extend his correspondence with the botanists of other countries, that he might have been able to have spoken with greater confidence of the plants described by them. With the British authors, in particular, he seems wholly unacquainted; a circumstance not indeed to be wondered at, if we consider the little intercourse between this country and the place of his residence; but that he should not have made himself master of the species noticed by the German botanists, and more especially those of the Flore de Dauphiné, the elucidation of which is peculiarly desirable, is what we are by no means able to account for in an equally satisfactory manner. In the next volume we trust that all these obscurities will be removed; and in the meanwhile we have no doubt but he may find very many among our countrymen, who would have real pleasure in communicating to him the plants of these kingdoms.

With regard to our great cryptogamist, he certainly speaks throughout his work in terms of high commendation, though qualified in a manner that most botanists will allow to be just. "Quantum ab illo (Swartzio) distet Dicksonus, acerrimus quidem Muscorum investigator atque detector, sed peristomii nimium incurius delineator, omnibus notum; e cujus laboribus ac inventis quamvis omni laude dignis scientia hucusque tantum incrementi ac commodi non percepit quam sperare fas erat, cum generis incertitudine omnia in dubio hæreant, prætereaque non satis constet muscos, quos pro novis venditavit, reipsa Botanicis cæteris hactenus ignotos fuisse. Sic ex. gr. *Bryum marginatum* hujusce auctoris, *Bryum serratum* Schraderi omnino esse videtur; *Bryum lineare* nihil aliud est quam

Dicranum pellucidum, etc." The last of these observations is not correct, though from the figure we cannot but acknowledge Mr. Bridel is justified in considering it so: the first had not escaped the notice of the author of the Irish Muscologia.

To the German botanists the author pays the following tribute of commendation, with which we heartily coincide, though at the same time we entertain the most sanguine expectation that England will not long be accounted inferior to Germany, in this or any other department of science. "Præ cæteris, hercle, lubenter fateor, Germani Hedwigiano quasi impulsi atque incitati animo, ejus vestigia fortiter premere pergunt, et nulla regio tanta cryptogamicarum plantarum indagatarum caterva gloriatur. Nihil in hac parte intentatum inexploratumque relinquunt; ubique fervet opus; montes ardui, impervii saltus, valles, nemora, paludes, omnibus et sæpe inclementissimis anni tempestatibus, avide perlustrantur; abscondita in lucem prodeunt; stirpium nostrarum tribus quotidie numero crescit. Jam Musci, quos Angliam et Sueciam solos educare autumabamus, nuperius in Germania, præsertim in Hercynia, Sudetum montibus, Thuringico saltu, alpibus tandem Salisburgensibus et Tyrolensibus lecti sunt; ac de Pinifero in Franconia monte sileam, cujus clar. Funk stirpes cryptogamicas nobis cognoscendas tradit, *Polytrichorum* familiam adaugens, et *Tetraphidem*, genus summopere depauperatum, nova specie (*Tetraphis ovata*) ditans."

The genus *Bryum* begins the present volume; and Mr. Bridel, having described all that he considers as the true *Brya*, among which he has included *B. dendroides* L., which from its habit we should hardly think really of this tribe, proceeds to enumerate those which he calls "*incerta et non genuina*," but which were ranked as *Brya* by preceding authors, previous to the introduction of the Hedwigian system, when the two great genera, *Hypnum* and *Bryum*, divided nearly the whole of the mosses between them. In the greater part of these he has not been able to do more than copy the accounts of the botanists who have described them, subjoining short notes, with his own opinions deduced from these descriptions.

Arrhenopterum still boasts but one species. Under *Mnium* are twenty-five, and among these *M. fontanum*, *M. tomentosum*, *M. marchicum*, and *M. sphæricarpon*, which Dr. Swartz and most botanists have removed to Bartramia, to which they have a closer affinity. Three new species are added to this genus: *M. inordinatum* (Dill. t. 31. f. 8.), *M. polycephalum* (*M. ramosum* Fl. Ang. ed. 1.), and *M. integrifolium* (*Bryum hornum* β. Huds. and Weis.), none of which our author has seen; so that the whole of them, as far as he is concerned, may be considered of uncertain authority. *Funaria* and *Webera* remain as with Hedwig; but under *Webera longicolla* is quoted, as a synonym, *Bryum cylindricum* of Dickson, which is so obvious from the figures and descriptions of Swartz and Dickson, that we cannot but wonder at its having escaped the notice of Dr. Smith. *Bartramia* is exceedingly enlarged; and as this is the genus to which Mr. Bridel appears to have paid most attention, we cannot but wish that Mr. Turner had had an opportunity of seeing this work previous to the publication of his monograph in the first volume of the Annals. That gentleman, however, has promised some observations upon the subject at a future time, and we therefore now content ourselves with observing, that there appear here as new species *B. stricta*, *B. ithyphylla*, *B. patens*, *B. pentasticha*, and *B. longiseta*, though some of these at first sight certainly seem too nearly allied to *B. pomiformis*. To *Pohlia* a new species, *P. intermedia*, is added, and *Bryum pallens* of Swartz is removed hither; with how much justice will be doubted by those, whose opinion of the accuracy of the Swedish is greater than that of the Swiss botanist. In *Buxbaumia, Timmia,* and *Fontinalis,* no alteration is made, except that the trivial name of *Timmia megapolitana,* in consequence of the plant's having been found in other places besides Mecklenburg, is changed to *polytrichoides,* a denomination that we allow to be more apt; but at the same time hope it will not be adopted, as there is no end to innovations of this kind, nor can any thing but confusion arise, if every author consider himself at liberty to alter names according to his own ideal standard of propriety. In the last genus, Meesia, we find a new species, *M. minor,* very nearly allied to *M. uliginosa,* and Dr. Swartz's *Cinclidium stygium* is also here arranged: but the propriety of this we own we do not comprehend; for, if the divisions of the inner peristomium be alone considered sufficient grounds whereon to build generic characters, *Cinclidium* must be admitted to be equally distinct from *Meesia,* as *Pohlia* and *Timmia* are from *Bryum.*

Mr. Bridel, in the volumes of his work hitherto published, has implicitly followed the system of Hedwig; but he promises that in his supplementary part in this respect "genera Hedwigiana quidem, quantum per scientiæ recentiores progressus observationesque novas licebit, servare tentabimus, at commodius et firmius instituemus, methodumque non prorsus novam sed forte basi stabiliore nitentem, peristomate solo ad genera condenda assumpto, proponemus; totam tandem Muscorum disciplinam ita explanare ac in propatulo ponere conabimur, ut illorum investigatio gratior minusque ardua tironibus fiat." In this attempt we wish him every success, and shall earnestly look to the fulfilment of his promise. His latinity is good and classical, though not unfrequently rendered nearly unintelligible by typographical errata. His descriptions are copious; and to the accuracy of his own observations we can speak without fear of contradiction, as we have examined very many mosses with his work before us, and found his remarks almost always faithful, even when in opposition to writers of established character.—It is therefore only to be lamented that he did not confine himself to such an undertaking as he could have executed with greater credit to himself, as well as much greater advantage to science in general.

R.

XXV. *Annales du Muséum National d'Histoire Naturelle, par les Professeurs de cet Etablissement. Tome Second.* à Paris, an xi. (1803.) 4to.

[Continued from page 179.]

I. DESCRIPTION *of a new Species of Salsola.* By Desfontaines. p. 28. with a figure.

SALSOLA *radiata ;* foliis lanceolatis, dentatis ; calyce coronula denticulata cincto ; semine orbiculari, hinc emarginato.

This handsome Salsola, easily distinguished from the other species by its large dentate leaves, is a native of North America, from whence it was sent by M. Michaux. It approaches Chenopodium in its lenticular seeds, not twisted in a spiral, and Salsola, in having a membranous cup surrounding the calyx. It is this last character that determined the professor to place this plant among the Salsolas, especially as this genus already contains some species which have not the seed twisted into a spiral.

We learn from the detailed description, that the membrane which surrounds the female flower, and afterwards serves as an envelope to the seed, is not, as has been usually described, the calyx itself, but a circle at the base of the calyx, which grows into a membranous cup of one piece, irregularly toothed at the margin, within which is the true calyx of five segments, as in the male flower.

II. *Rare*

II. *Rare Plants which have flowered in the Garden or the Conservatories of the Museum.* By the same. p. 30.

COBEA *scandens.* Cavan. Icon. 16.

This beautiful climber, which has found its way into our gardens also from Madrid, was named by Cavanilles in honour of Father Barnabas Cobo, a Jesuit, who, after living forty-five years in North and South America, composed a natural history of the New World, in ten books, about the middle of the seventeenth century, which was never published.

We are informed by M. Desfontaines that it belongs to the natural order of Polemonia, and explains new affinities between this class and that of the Bignoniæ.

CORREA *alba.* Bot. Repos. t. 18.

M. Joseph Corréa de Serra, the learned Portuguese naturalist, owes the honour of having this plant named after him, not to the author of the Botanist's Repository, as is here recorded, but to the president of the Linnean Society. Several other species are known in this country, and Mazeuthoxeron rufum and reflexum, t. 17. and 19. of Labillardiere's Voyage in search of La Peyrouse, both belong to this genus. Native of New Holland.

ASTER *glutinosus.* Cav. Icon. t. 168.

Differs from Inula, of which it has entirely the habit, in not having the bristles at the base of the anthers, and from Aster in having a yellow radius to the flower.

ARISTOLOCHIA *caudata.* Jacq. Amer. t. 145. Spec. Pl. 1362.

The following new specific character is substituted:

Aristolochia volubilis; foliis cordatis, emarginatis; floribus solitariis; labello plano, flabelliformi, acuto; appendice recto, filiformi, apice incrassato.

A detailed description and very neat figure are added.—Every part of the plant, when bruised, emits a nauseous fetid smell.

III. *Account of a Package of foreign Plants sent from England by Mr. Woodford, with observations on the cultivation of the Teak-tree.* By A. Thouin. p. 75.

In exchange for plants which he had received from the museum in the spring preceding, Mr. Woodford sent a package of eighty-six species, several of which are here enumerated; amongst them we observe fourteen species of Amaryllis, Coccoloba pubescens, the striped-flowered, and white double varieties of Camellia japonica, the latter of which unfortunately perished on the passage. But the most important, as being the most useful, was a young tree of Tectona grandis, the Teak-wood, so celebrated for ship-building in the East Indies. The author makes a long digression upon the possibility of cultivating this tree in the southern parts of France, observing that whilst the limited sphere of its growth in the interior of Indostan, upon the borders of the Ganges, and in Cochin-China, seems to render it improbable that it can ever be naturalized to Europe; on the other hand, its having buds (gemmæ) covered with scales, its leaves being deciduous, and the tree remaining in a state of inaction during part of the year, give reason to hope that it would the better resist the cold of an European winter. The difficulties appear to M. Thouin to arise from certain habitudes which these plants possess, owing no doubt to a peculiar organization, not yet discovered by physiologists. These habitudes require a long time and much trouble to be accommodated to a new climate. Thus, many seeds which ripen at a certain season of the year, when transported to a different climate, germinate nevertheless at the same time that they would have done in their native soil. 2dly, Certain plants with compound leaves continue to shut up their leaflets at sun-set and to open them again at sun-rise. 3dly, A great number of plants continue to blossom at the same time in countries foreign to them, as they have been accustomed to do in their native soil. 4thly, Several trees which lose their leaves at a certain season of the year in their native country, continue to shed them, and to open their young buds at the same time, in a foreign clime, and will not live except in the same kind of soil, a similar exposure, and the same degree of elevation to which they have been accustomed in their own country.

Many of these habitudes depend upon circumstances entirely exterior to the plant; such as the degree of heat, light, and moisture, variously modified, and the more or less compact nature of the soil, and the qualities of the air. Of this we have long had many proofs, but no accurate experiments have hitherto been made upon the part which the organization of the vegetable bears, in determining its habitudes, and of the precise effect of foreign agents. Confounding these two causes, so distinct in themselves, we are contented with saying that it is the nature of a particular plant not to grow in such a climate, exposure, or soil, to germinate and to flower at such a time; but perhaps all or the greater part of these habitudes are owing entirely to external agents, which modify them according to the circumstances. This research is worthy the labour of the physiologist, on account of the great advantage that would accrue from the solution of these problems in the naturalization of foreign vegetables.

In the mean time long practice in cultivation, and some solitary experiments, have proved that some of these habitudes are not so inherent in the vegetable, but that they may be modified and even changed. Experience has proved, 1st, that individual plants brought from their native country rarely lose their habitudes, especially if they come from a warmer climate than that to which they are introduced; 2dly, that plants raised from seeds ripened in their native country preserve a part of the habitudes of the mother plant, though removed into a very different climate;

mate; 3dly, that it is only after several successive generations from seeds ripened in the country to which they have been removed, that plants lose a part of their original habitudes; 4thly, that three or four years are sufficient to produce this effect in plants that spring up and bear in the space of three months; 5thly, that plants which are a year in arriving at maturity require a longer time; and as for the trees, ages will hardly suffice to destroy a part of these habitudes in them, so as to naturalize them to a different clime, even with all the assistance that art can give.

The author infers from the external characters of the teak-tree, that it may be possible to naturalize it to the climate of southern Europe, in places where dates, oranges, and lemons grow in the open air, for among these it lives in India.

In attempting this naturalization it may be of use to know, that in its native country the teak generally grows in the plains, and on hillocks not far distant from the great rivers, which overflow their banks regularly every year; 2dly, that it grows most vigorously, and becomes loftier in a deep stiff loam, mixed with gravel, than in any other soil; and, 3dly, that the seeds very readily lose their vegetating principle, so that they will not grow when transported to Europe.

M. Thouin nevertheless recommends the attempt to preserve the seeds in preference to the transporting young plants, and details a mode of conveying them which he has found to succeed with others of a similar nature. This mode consists in putting alternate layers of mould and of the seed in boxes, in the following manner: The bottom of the box being bored full of holes, cover it with a bed of small pebbles or shells, then put a layer of earth two inches deep, then another of the seed with the outer coverings taken off, placed side by side, a few lines distant from each other;

cover these again with earth, pressed down firmly on the seed, and smoothed at the upper surface, to receive another layer of the seed, and thus alternately a layer of earth and seed till the box be filled to within an inch of the top: the empty space above to be filled with long moss pressed strongly down, and covered with stout iron wire-work, with openings four inches square, nailed to the top of the box, which is then to be arched over with lattice-work, to keep the rats or domestic animals that may be on board the ship from disturbing the seed. During the voyage care should be taken to water the moss frequently, but gently, so as to preserve the mould sufficiently moist to favour, without hastening, the vegetation of the seed; to expose the box as much as possible to the open air, but to defend it from the direct rays of the sun and from heavy rains; for which purpose a canvass cover, painted white, should be made, to be put on or off as occasion may require. In cold latitudes the boxes must be removed below deck, and the greatest care must at all times be taken to prevent the seed from being wet or moistened with the sea-water. The upper layers of the seed will soon shoot through the moss to get at the air, but the germination in the deeper layers will be less advanced: the former generally perish when planted, but of the latter many will succeed.

At the end of this paper three other presents are recorded: one from Cit. Lechartier, florist at Caen; a second from M. Schweyckert, principal botanical gardener to the Margrave of Baden; and the last from Lady Hume, of seeds from China, the fruit of the Sterculia Balanghas, and several rare plants, which unfortunately arrived in very bad condition, and at a season of the year unfavourable to their recovery.

IV. *Upon the Jalap Plant.* By Desfontaines. p. 120.

Jalap grows naturally in Mexico, in the neighbourhood of Xalapa, where it is collected in great abundance as an article of commerce, and whence it derives its name. M. Thiery de Menonville, in his Voyage to Guaxaca, printed in 1787, relates that the plant is equally common about Vera Cruz, but that the inhabitants were ignorant of it before he pointed it out to them, and were in the practice of purchasing the drug for three reals the pound.

This root, which, according to de Menonville, sometimes weighs twelve, fifteen, and even twenty pounds, is too well known here to render it necessary to repeat the description, or his account of its medicinal effects. We owe the knowledge of it to the Mexicans, with whom it appears to have been in great use at the time of the conquest of this country by the Spaniards.

The effects of this drug upon fermentation, said by Miller to be well known to our brewers and distillers, and of which even our bakers are supposed to avail themselves in the art of bread-making, would form a very interesting, perhaps a very useful subject of investigation.

The plant that produces the Jalap was for a long time unknown: Linnæus, in the first edition of his Materia Medica, supposed it was the Marvel of Peru of our gardens; afterwards, from a similarity in the outer coat and the internal texture, as well as from the size, he guessed that the Mirabilis longiflora might be the plant producing it. Then Bergius observing that the roots of Mirabilis dichotoma purged sufficiently well, whereas the roots of the other species had but little effect, fixed upon this latter plant as the true Jalap, and the authors of the Swedish Pharmacopœia adopted his opinion; but if these authors had had any opportunity of comparing the recent roots of Jalap with these three species of Mirabilis, they could not have fallen into such an error.

In the mean time our countrymen, Ray, Houston, Sloane, and Miller, had already said that Jalap was the product of a species of Bind-weed, or Convolvulus; and Linnæus in his first Mantissa, and in the second edition of his Materia Medica, came over to their opinion, and named the species Convolvulus Jalapa. Houston, who saw the plant in its native country, and carried fresh roots of it to Jamaica, but which perished by the negligence of the person intrusted with their cultivation, on his return to England brought with him dried specimens with flowers, which he showed to Bernard de Jussieu, who was then in London; and this able botanist knew it to be a species of Convolvulus. Miller, who received seeds of the same plant, sowed them in the garden at Chelsea, where they germinated and produced large roots, and trailing herbaceous stalks, nine or ten feet in length, furnished with oval leaves, both entire and lobed, but not one of the plants flowered. He adds, that he received a drawing of the plant from Houston, with the flowers, and that it was a real Convolvulus. He even remarks that the seeds are covered with a down, a character which distinguishes the Jalap from other species of Convolvulus.

Murray, in his Materia Medica, adopted the opinion of Ray, Houston, and Miller; and Thiery de Menonville, who had been at Xalapa and Vera Cruz, and had seen the Jalap plant there, not only confirmed their opinion, but assured the author of this memoir, that the plants cultivated for some years past in the stoves of the museum of natural history, do not sensibly differ from what he saw in America, and are of course the true Jalap.

Although it is acknowledged in this memoir that it appears by its simple stigma only a little hollowed, to belong rather to Ipomœa than to Convolvulus, yet he leaves it in the latter genus, being doubtful of the propriety of separating Ipomœa from Convolvulus, and gives the following specific character:

Convolvulus *Jalapa*; caule volubili, tuberculato; foliis cordato-ovatis, subrugosis, subtus villosis, integris aut lobatis; pedunculis uni- vel multifloris; filamentis basi tomentosis; semine lanigero.

A detailed description and good figure of the plant, with dissections of the parts of fructification, are added.

The author remarks also that Michaux found the Jalap growing spontaneously in a province to the south of Florida, and removed it to Charles Town, South Carolina, where it multiplied readily. It was to seeds of these, brought by M. Bosc, on his return from the United States, and which he presented to M. Thouin, that the plants now in the garden of the Museum owe their origin. Thiery observes that it grows without culture in a dry and gravelly soil. In the climate of Paris it requires the heat of the stove; but in the southern departments, where the climate is similar to that of Charles Town, M. Desfontaines supposes it may thrive in the open air.

The author finishes this memoir with observing, that several more of the purgative drugs in common use are derived from different species of Convolvulus, such as Turbith, Scammony, Mechoacan, Soldanella, &c. and that probably some of the Ipomœas have similar virtues, as these genera have so very near affinity to each other. At the same time he remarks that the sweet-potatoe (Convolvulus batatas Linn.), the roots of which are saccharine, and nutritious, belong to the same natural family; whence he concludes that if the virtues of plants do in general coincide with their natural affinity, yet that there must be exceptions to this rule.

V. *On the Amaranthaceæ*. By Jussieu. p. 131.

A translation of this paper is given at length in this volume of our Annals, p. 274.

VI. *On the Genus Vieusseuxia, belonging to the family of the Ideæ.* By Decandolle.

The author of this paper, following De la Roche, separates the monadelphous species of Iris, forming of them a distinct genus, under the name of Vieusseuxia, which, he observes, differs from Iris in the same manner as Sisyrinchium does from Moræa, and Galaxia from Ixia.

Our friend Mr. Bellenden [late Gawler] has shown, in the first volume of our Annals, p. 219. of how little value, as a distinguishing character, the union or disunion of the stamens is to be considered in this natural order. He has at the same time, from more essential characters, separated these plants from Iris, and added them to the genus Moræa.

M. Decandolle enumerates seventeen of what he supposes to be distinct species of Vieusseuxia, of the last of which he has given an engraving, and has called it V. glaucopis, but it is the same with Jacquin's Iris tricuspis, Moræa tricuspis var. β. of Gawler, figured at no. 168, and described no. 696 of the Botanical Magazine.

VII. *On the Geranium hirtum of Forskäl.* By Desfontaines. p. 210.

A species of *Erodium*, according to L'Heritier's division of these plants, but which this author does not adopt. M. Desfontaines considers it to be only a villous variety of the G. crassifolium of his Flora Atlantica, ii. p. 211.

A native of Barbary and Egypt. The roots, which grow something in the manner of those of the Dropwort, are eaten by the Arabs, and are said to have an agreeable slightly acid taste. A good figure and detailed description are subjoined.

VIII. *Description of a new species of Sow-Thistle.* By the same. p. 212.

Sonchus *divaricatus*; glaber, procumbens; foliis glaucis runcinatis, denticulatis; floribus lateralibus; semine rugoso. A native of Egypt, where it grows in gravelly places. The most remarkable feature in this plant is the divaricate branches, which according to the accompanying figure go off almost at right angles.

IX. *On Petunia, a new genus belonging to the order of Solaneæ.* By. Jussieu. p. 214.

This is an account of two plants in the herbarium of Commerson, from near the mouth of the Plata, which appear to belong to the same genus, and to be distinguishable from every other in the family of Solaneæ, where their place appears to be near to Nicotiana; and on account of this affinity with Tobacco, the *Petun* of the Brasilians, Jussieu has given it the name of Petunia, and distinguishes it by the following designation, in which the characters common to the family are omitted.

Petunia. *Calyx* profunde 5-fidus, laciniis oblongis subspatulatis. *Corolla* tubulosa, limbo dilatato, subquinquelobo, inæquali. *Stamina* 5, inæqualia, non exserta, antheris subrotundis. *Stigma* capitatum, subbilobum. *Capsula* calycis basi infra cincta, apice 2-valvis, 2-locularis, polysperma, seminibus minutis.—Herbæ; folia alterna, floralia ex eodem puncto gemina; flores solitarii axillares.

The two species are thus characterized:

P. *parviflora*; caulibus prostratis; foliis (Cerastii) minimis, oblongis; corollis parvis, vix calyce longioribus.

P. *nyctaginiflora*; caule hirto; foliis (Heliotropii) ovato-oblongis, pubescentibus, corollis magnis, calyce quadruplo longioribus.

X. *Observations on a consignment of living plants, and on the naturalization and culture of the New Holland Flax, which made part of the consignment.* By A. Thouin. p. 228.

The plants of which this paper gives an account, were received from Mr. Grimwood, nurseryman, in exchange for some sent to him from the garden of the museum, which it is not necessary to enumerate here. Among them was HELICONIA *Psittacorum*, which M. Thouin says bears flowers like in colour to the plumage of a parrot; but we believe that its name is derived, not from the colour of the flower, but from a supposed resemblance in its form to a parrot's beak.

In speaking of a species of MAGNOLIA from China, the author, while he observes that the circumstance of its leaves being naturally deciduous, and its buds protected by scales, seems to indicate that it might live in the open air in France, adds, that on account of our summer being its natural time of rest, when it is disrobed of its foliage, and the young leaves shooting in the beginning of our winter, a stove becomes necessary to its preservation, unless this habitude could be changed; which he supposes might probably be effected by gradually lengthening its season of repose every year, either by keeping it in a cold place, as long as it did not begin to vegetate, or depriving it of the quantity of humidity and light necessary to its growth. By such means he supposes it might by degrees be preserved in a state of inaction through the winter, so that it would put forth its leaves in our spring with the rest of our trees. In confirmation of this idea, the experiment made at Moscow, by the late M. Demidow, is quoted, who, by keeping in an ice-house some apple- and pear-trees sent from France, preserved them in a state of inaction for nineteen months; that is, thirteen months longer than their natural time of rest. In the spring they were exposed to the open air, when they vegetated and bore both flowers and fruit.

The PHORMIUM *tenax*, or New Zealand Flax, was the most important of these plants on account of its great utility. For a comparison between the strength of the fibres of the Phormium and of Flax, the author refers to the experiments made by M. Labillardière, and communicated in a memoir read at the Institute the preceding year. He is very sanguine in his expectations that the climate of France may prove favourable to its cultivation; and as it is found to grow spontaneously in New Zealand, on the dry sands near the sea, and in hollows continually wet by the salt water, he recommends the trial of it to the proprietors of such soils in France, which so far from being of any value are really injurious, by the blowing of the sand over the cultivated lands. The climate of New Zealand, lying between the thirty-third and forty-seventh degree of south latitude, must be nearly the same with that of many parts of France, but colder in the winter, hotter in the summer, and more variable, because the Frozen Ocean extends over a much wider field at the southern than at the northern pole: consequently, when the wind blows from the south, passing over mountains of ice, it must make the air cold even in summer; whereas when it blows from the north the heat must be equal to that on the coast of Barbary, lying in nearly the same latitude. An accidental occurrence respecting a plant of the Phormium, cultivated in the stove, may be considered, if not as a proof, at least as affording a presumption of the truth of this remark; for, having arrived in the depth of winter, in a bad state, from England, without any fibres to its roots, it was plunged into a fresh made bark-pit, under which a fire was kept up during the whole of the month, by which means in that part of the stove the heat was constantly 47° of Reaumur's thermometer, a heat three or four degrees greater than what occurs in the hot sands of Africa, and more than that proper for hatching eggs. Notwithstanding this very high temperature, the Phormium, as well as Pandanus odoratus, Calamus Rotang, Dracæna pendula and ensifolia, and Tradescantia discolor, which were in the same part of the stove, were not at all overcome by the heat, but on the contrary flourished extremely, and some of them bore flowers and fruit. It is true that they were supplied with water in proportion. It should be observed here, that this season corresponded with the summer in their native country; that of the Phormium especially is but little distant from our antipodes. The climate which promises to be the most favourable for the naturalization of this plant, appears to M. Thouin to be in the southern departments of France, on the shores of the Mediterranean Sea, near to Nice or Hiers, as bearing the greatest resemblance to New Zealand, both in the latitude, and in a soil abounding with salt water. But he does not despair of its being at a future time naturalized to other parts, especially when it is considered that hemp was originally derived from Persia and the East Indies, countries much hotter and more fertile than New Zealand. M. Thouin, however, seems here to forget that hemp is an annual plant, and consequently one of which the habitudes, as he had before observed, are much more easily changed. It should have been mentioned, indeed, that he founds his hopes of success in part upon the nature of the roots of the Phormium, the young suckers of which, having somewhat the nature of the buds of trees, and growing several inches under ground, are thus protected from frost.

M. Thouin has also, at page 252, made mention of some plants received from Mr. Fraser, the nurseryman, of which he particularly names—1. A new species of MAGNOLIA, remarkable for the length of its leaves, nearly two feet, as well as its beautiful form. To this species Mr. Fraser has given the specific title of *Michauxi*, in honour of A. Michaux, whom he had the good fortune to meet with in America. 2. A new species of Palm, under the name of Corypha Hystrix, from the stalks being covered with long stiff fibres, like the quills of a porcupine. 3. ANDROMEDA *dealbata* (A. *pulverulenta* Bot. Mag.). 4. PHLOX *stolonifera* Bot. Mag.—5. GLOBBA *nutans*.—6. A handsome new species of LATROPHA (*Jatropha panduræfolia*

Bot. Mag.) named by him "Iatropha Imperialis Petropolitana;" on which M. Thouin, with great good nature, remarks that it is a bad name, which serves, however, to show Mr. Fraser's grateful acknowledgments to the emperor of Russia, at whose expense he travelled.

XI. *Observations on Rheum Ribes* Linn. By Desfontaines. p. 261.

Rheum *Ribes*; undique verrucosum; foliis rotundatis, sublobatis.

After a long list of synonyms from Serapion to the Hortus Kewensis, the author observes that it was raised in 1788 in the garden of the National Institute, from seed gathered on Mount Lebanon, by M. Labillardière, and that it has survived several winters in the open air, and flowered for the first time the latter end of the spring of 1803.

This plant, so celebrated by the Arabian physicians Rhazis, Mesua, and Serapion, as a refrigerant in fevers, and to suppress bilious vomitings and diarrhœas, appears by the account of modern travellers still to be held in high esteem both in Syria and in Persia. A full description, with a good figure of the flowering stem, and an imperfect sketch of a leaf, are here given.

XII. *Observations on the family of Nyctagines.* By A. L. Jussieu. p. 269.

A translation of this paper is given at length at p. 278 of this volume.

XIII. *Observations on Acicarpha and Boopis, two new genera of the family of Cinarocephalæ.* By A. L. Jussieu. p. 345.

These two plants are from the herbarium of Commerson. The first of them, as the detailed description shows, has the nearest affinity to the false Cinarocephalæ, (which, the author observes, contain the elements of a new family,) and above all to Gundelia. He derives the name from ακις sharp, and κάρφος chaff, on account of the spinous paleæ of the receptacle, and establishes the following generic character from the only known species.

ACICARPHA. Calyx communis simplex, 5-partitus, multiflorus. *Flores* flosculosi 5-fidi, antheris in tubum coalitis. Stigma simplex. Receptaculum tectum paleis, apice incrassato concrescentibus et supra in acumen attenuatis, coalitis ideo in fructum ovoideum, echinatum (tribuli instar), pluribus excavatum loculis 1-spermis, semine non papposo.—Herba ramosa; folia alterna; flores in ramulis solitarii, terminales. Obs. Flosculi centrales forte masculi. Receptaculum in fructu oblongum, tenue, loculos ferens circiter 15, ejusdem lateribus quintuplici serie et triplici ordine appositos.

A. *tribuloides*; foliis oblongis, sinuatis, inferioribus spatulatis, superioribus basi latiore semiamplexicaulibus. *Ex Bonaria.*

This genus, of which the fructification is so different from every other, will perhaps afford the type of a new family, or at least of a new section in the Cinarocephalæ.

The other genus here established belongs likewise to the family of the false Cinarocephalæ, and approaches very near to Echinops and to Calycera of the late Cavanilles. It contains, besides the species here described, another designated by Ruiz and Pavon in their Flora Peruviana, vol. i. p. 49. t. 76. under the name of SCABIOSA *sympaganthera*. But its alternate leaves, united anthers, and simple partial calyx, remove it far from the Dipsaceæ, and bring it near to the false Cinarocephalæ. To this plant M. Jussieu has given the name of Boopis, from *βους* ox, and *ωψ* eye, on account of the round form of the head of the flowers, resembling an ox's eye.

BOOPIS. Calyces numerosi, uniflori flore flosculoso, hermaphrodito tubuloso, 5-fido; turbinati 4- aut 5-fidi; aggregati in capitulum hæmisphæricum supra receptaculum parvum, paleaceum, paleis linearibus; intra calycem communem, multipartitum simplicem. Singulis flosculis antheræ in tubum coalitæ, et stigma simplex. Semen cum calice proprio concretum, ejusdem laciniis persistentibus, squamiformibus, coronatum, paleis cinctum ultra prominulis. Herbæ multicaules ramosæ; folia alterna simplicia; flores in ramulis terminales, solitarii. Species sunt

B. *anthemoides:* caule vix octopollicari; foliis lineari-pinnatifidis. *Ex Bonaria.*

B. *balsamitæfolia:* caule bipedali; foliis spatulato-sinuatis.—Scabiosa *sympaganthera* Flor. Peruv. l. c. *Ex agro Chiloensi.*

As the first of the two genera, characterized in this paper, contains but one species, it appears surprising to us that so great a botanist, as Jussieu, should have added a specific character, which being destined solely to distinguish one species from another, and therefore frequently called the differential character, cannot properly have any place where only one species is known.

XIV. *Observations on Kleinia and Actinea, two new genera of the family of Corymbiferæ.* By A. L. Jussieu. p. 423.

This paper contains two more genera from Commerson's herbarium. The first has considerable affinity with Eupatorium, from which it is distinct by its habit, and having a large, spreading, short, and many-flowered calyx. By its fleshy leaves, and whole habit, it approaches also to the woody species of Cacalia. Between these plants the author proposes to place his Kleinia, named in honour of the celebrated German naturalist, Jac. Theod. Klein, thus re-establishing a name formerly applied to the thick-leaved woody plants, since united by Linnæus with Cacalia. The generic character he gives as follows:

Kleinia. Flores flosculosi, hermaphroditi. Calyx latus,

patens

patens imbricatus, squamis subrotundis triplici ordine dispositis, multiflorus. Pappus brevis, plumosus. Receptaculum nudum. Suffrutex; folia opposita, flores in ramulis solitarii, terminales.

Kleinia *linearifolia:* foliis connatis, linearibus, integerrimis, crassiusculis; floribus pedunculo reflexo nutantibus.

The other plant has great affinity with Hymenopappus of L'Heritier, the Rothia of Lamarck, from which it is distinct in having radiated flowers, and a calyx of one rank, differently divided. The name is derived from ακτιν a ray; but Actinia having been already applied to one of the mollusca, in the animal kingdom, is scarcely admissible. The generic character is given as follows:

ACTINEA. Flores radiati, flosculis hermaphroditis, 5-fidis; ligulis femineis apice trilobis. Calyx polyphyllus, brevis, simplici serie. Semina extus pilosa coronata pluribus aristis infra marginato-alatis. Receptaculum nudum. Herba folia alterna.

A. *heterophylla:* multicaulis, rufescens; caulibus apice nudis 1-floris, infra foliosis; foliis inferioribus lanceolatis, sinuatis aut dentatis, superioribus linearibus integris. *Ex Bonaria.*

The affinity between Actinea and Hymenopappus calls to mind another plant in Commerson's herbarium, united by Jussieu with the latter genus, from which, however, it differs by the seed being furnished with a double pappus, whence it becomes necessary to admit in the general character of the genus, a pappus either simple or double. The two species may be distinguished as follows:

HYMENOPAPPUS *scabiosæus* (L'Herit.): foliis pinnatifidis; floribus subcorymbosis, terminalibus; pappo simplici, paleaceo. *Ex Carolina.*

H. *anthemoides:* foliis decompositis, linearibus; floribus axillaribus, solitariis; pappo duplici, interiore paleaceo, exteriore piloso. *Ex Bonaria.*

XV. *Observations on the Cultivation of Heaths.* By A. Thouin. p. 444.

The occasion of this paper was the receipt of a hundred species from Messrs. Lee and Kennedy, which arrived in great perfection, and even without appearance of their having travelled, although two-thirds of them were in full flower at the time. They were taken out of the pots, with care to preserve the earth as much as possible about the roots, and closely tied up, individually, in dry long moss, and after this in strong brown paper, and then packed in boxes, so as to allow of no empty spaces, by which means they neither suffered by crossing the sea, nor by the shaking of the *diligence*, by which conveyance they were sent.

As the treatment of these plants is probably much better understood here than in France, we need not insert any part of M. Thouin's instructions, and shall only mention an observation he makes, which we do not remember to have seen before, *that* the heaths are in their native country *naturally* more short-lived than most plants with woody stems, the term of life of far the greater part being limited to a space of from six to ten years.

XXVI. *Choix des Plantes, dont la pluspart sont cultivées dans le Jardin de Cels; par* E. P. Ventenat, *de l' Inst. Nat. de France, &c.* à Paris, de l'Imprimerie de Crapelet. an xi. seq.

We have upon another occasion mentioned the appearance of the first number of this highly useful and elegant work of M. Ventenat, the continuation of the well known *Jardin de Cels* of the same author. The first five numbers now before us bear testimony both to the great ability of M.

Ventenat as a botanist, and to the superior skill of Sellier and others as artists; for the text affords a great deal more than the dry unsatisfactory descriptions which we are accustomed to find in many works of this nature, and the engravings may safely be held up as patterns to the artists of any nation without exception.

1re Livraison.

1. GUETTARDA *scabra.* Mathiola of Plumier had been long suspected to be nearly allied to Guettarda, and M. Ventenat now shows that it is the species here described and figured; it was brought from Porto Rico to France, and is now cultivated in the hot-houses of the Museum and of M. Cels. The difference found in Plumier's figure of the parts of fructification, is, we think, to be ascribed to his having examined the flower in too advanced a state; for the ovary there represented is swelled beyond its common size, nor were the stamens any longer present, whence he described what he thought to be female flowers. M. Ventenat's opinion, that Plumier's drawing and description were made before the perfect expansion of the flower, does not therefore appear altogether probable. Does the fruit, given to the author by Riedlé, and represented in the plate before us, really belong to Guettarda scabra?—2. TOURNEFORTIA *laurifolia*; a new climbing species from Porto Rico, with small yellow flowers. It comes near to T. volubilis, but appears to be distinct by its much larger oval-oblong leaves, its long and simple cyme, and the fruit, which does not consist of four distinct ossicula, but only of two, each having two inseparable lobes.—3. TOURNEFORTIA *mutabilis*, a native of Java, is a new species, distinguishable from the others by its ovate, entire, rough leaves, short cymose spikes, and the crenulated laciniæ of the corolla. It has obtained its name from its flowers, originally of a greenish white, acquiring by degrees a very deep black colour.—4. PHLOMIS *Samia* L., a very rare plant,

brought by Bruguière and Olivier from the high mountains of Caramania, and cultivated by Cels. We learn here that Tournefort's *Phlomis Samia herbacea Lunariæ folio* is certainly a synonym of this plant (contrary to Desfontaines's opinion), as is proved by a specimen in Jussieu's herbarium, with Tournefort's own handwriting. We too have had an opportunity of comparing it with the original specimen in the Herbarium Cliffortianum, from which Linnæus made the species, and have no doubt that both are the same.—5. ARDISIA *crenulata.* M. Ventenat has the merit of having first pointed out that the genus Ardisia of Solander, together with some other genera, constitutes an order of itself, which he calls *Ophiospermæ,* and of which he has drawn up the character in his Jardin de Cels. Some observations on this natural order and its genera, we propose to give at another opportunity. As for the species here described, and supposed by M. Ventenat to be new, it is indubitably only a slight variety of Ardisia serrulata of Swartz; for the only difference stated is in the leaves not being *rugosa,* nor *subtus ferrugineo-punctata*; a character which we have found to be subject to variation even in those few specimens that we have had an opportunity of comparing with the description and figure before us.—6. DAVIESIA *juncea* Vt. This is the Sophora juncea of Schrader and Pultenæa juncea of Willdenow, since made into a new genus by Dr. Smith, under the name of Viminaria (Ann. of Botany, vol. i. p. 507.).

2me Livraison.

7. HERACLEUM *Absinthiifolium* Vt. This species, found by Bruguière and Olivier on the road from Bagdad to Kermanchah, is the same with Tournefort's *Sphondylium orientale humilius, foliis absinthii.* It approaches in its characters to Tordylium; but its umbel being regular, its calyx not of five teeth, but almost entire, and the seed

neither corky nor crenulated, the referring it to Heracleum appears by no means improper. Its specific character is thus given: H. incanum, foliis decompositis, foliolis cuneiformibus trifidis; corollis subuniformibus, fructu villoso. Leaves when rubbed diffuse a smell similar to that of Apium graveolens.—8. JASMINUM *geniculatum*. This is no other than the *lucidum* of the Banksian herbarium, figured in the Botanist's Repository under the name of *gracile*. We find it observed here, that "the geniculated and elbowed petiole of this plant, not observed in any other species of Jasmin, was thought the most eligible character to derive the specific name from:" and again, that "Forster has made mention of a species of Jasmin under the name of *J. simplicifolium*, which however cannot be the same with J. geniculatum, since that learned botanist could not have silently passed over a character which so essentially distinguishes the latter species; besides that the name of *simplicifolium* is applicable to several species of this genus." On these passages we have to remark, that Forster's species is certainly quite distinct from the one here described, but is equally furnished with geniculated petioles, although he has taken no notice of them. As to the name *simplicifolium*, it may be observed that, at the time when Forster described his plant, it was the only Jasmin with simple leaves known to him, for the Sambac was then referred to Nyctanthes. At present this name is certainly inapplicable; but the same may be said of that given by Ventenat to the species here figured and described; for though no mention is made of it by Willdenow, Vahl, or any other describer we know of, yet it is not the less true that *all* the simple-leaved species of Jasmin have *geniculated* petioles, as every one may easily observe, even in dried specimens. In some species it is more striking than in others, such as in *glaucum*, *simplicifolium*, and four undescribed species in the Banksian herbarium, from Java and Africa.

The fact is, that the leaves of the Jasmins are simple only by abortion, and that the part of the leaf-stalk where the knee appears is exactly the place where nature intended two other leaves to issue. This is particularly obvious in J. auriculatum, in which some of the leaves are simple, and have stalks furnished with a marked articulation, while others are without, but exhibit at the same place two opposite leaflets. In those species with simple leaves, in which the knee is not distinctly visible in a dry state, we may easily be convinced of its presence by breaking off a leaf, when it will be found that the separation takes place regularly in the middle, while the lower part of the petiole remains in connection with the branch.—9. VILLARSIA *ovata*; Menyanthes ovata of Linnæus. The genus Villarsia is taken up from Gmelin, who gave that name to the Anonymos aquatica of Walter (Fl. Car. p. 109.). It is the same with Nymphoides of Tournefort. M. Ventenat has referred to it three other species of Menyanthes, and assigned to them the following generic character: *Cal.* 5-partitus, persistens. *Cor.* rotata, limbo sæpius ciliato. *Styl.* brevissimus. *Caps.* 1-locularis, 2-valvis, valvularum marginibus incrassatis. *Placenta* in suturis capsulæ. *Sem.* duplici serie longitudinaliter digesta, margine membranaceo cincta. The congeneric species of Villarsia are V. nymphoides (Menyanth. nymphoid. Willd.), V. ovata (M. ovata Willd.), V. indica (M. indica Willd.), and V. lacunosa (V. aquatica Gmel.).—10. IXIA *dubia.* This species, which we have no doubt is the small spotted variety of I. maculata, or the *I. conica* Gawl., is thus characterized: I. foliis ensiformibus, scapo monostachyo, floribus maculatis, spatharum valva exteriore uniaristata, interiore biaristata.—11. DILLENIA *volubilis.* A plant confounded by the late Mr. Curtis with the Dillenia indica L. or speciosa Thunb., afterwards made by Mr. Andrews into a new genus, Hibbertia, and again brought forward by M. Ventenat as a species of the former genus, to which it is here stated undoubtedly to belong, according to the reformed generic character given by Thunberg in the Linnean Transactions. It is in vain to enter into any examination of the justice of so doing, before we know the fruit of the plant in question, a part so characteristic in Dillenia speciosa, that a comparison of it with that of the other will easily settle the point. All we can now say is, that its habit, and the nature of the leaves, is entirely different from that of the above-mentioned species.—12. CROTON *penicillatum*, the C. ciliato-glanduliferum of Ortega, which name is here properly exchanged for another, so much the more proper as it expresses a chief character. This shrub, a native of Cuba, contains, like many of its congeners, a milky juice in all its parts. Its distinctive character is thus given: C. foliis cordatis integerrimis ciliatis, petiolis basi apiceque penicillatis, stipulis setosis ramosis, caule fruticoso. The stamens of this species do not appear to be monadelphous.

3me Livraison.

13. MIMOSA *floribunda* Vt. One of the handsomest of those species which, when adult, bear petioles without leaves. It resembles in some respects the *suaveolens* of Smith, and the *longifolia* of the Botanist's Repository, but is distinct from both, as the following specific character seems to indicate: M. foliis sparsis, lanceolato-linearibus subfalcatis, spicis axillaribus longitudine foliorum, petalis reflexis. The flowers of this shrub, a native of Botany Bay, are very sweet-scented, something like those of Jasmin, and their sulphur-colour is here said to form a pleasing contrast with the light and delicate green of its lance-shaped leaves (petioles).—14. ANAGALLIS *fruticosa*. This very remarkable plant, which has also found its way from the Paris gardens into ours, and has since been figured both in the Botanist's Repository and Botanical Magazine, is a

native of Mogadore, from whence the seeds were sent to M. Cels by M. Broussonet, now professor of botany at Montpellier. It is distinct from the other species of Anagallis by its size and woody stalk, as well as several other characters; not however, as here observed, in the colour of its flowers, which is exactly the same as in Anagallis arvensis.—15. COLLETIA *serratifolia* Vt. foliis oblongis obtusis argute serratis, floribus apetalis—and 16. COLLETIA *Ephedra* Vt. aphylla, ramis erectis implexis apice spinosis, floribus in nodis ramulorum glomeratis. Both these shrubs are natives of Peru, where they were discovered by Dombey. The former is spinous, having the habit of a Lycium; the latter entirely leafless, like the plant from which its trivial name is derived, and divided into a great number of branches, each terminated by a spine. We suspect that more congeners of these plants will be found among what are now supposed to be species of Rhamnus.—17. SPARTIUM *sericeum* Vt. ramis striatis, inferioribus aphyllis, foliolis subtus sericeis, floribus terminalibus capitatis, leguminibus subclavatis monospermis. Raised in Cels's garden from seeds sent by Broussonet from Mogadore. This broom is also cultivated by Mr. Aiton of Kew, under the name of *Spartium umbellatum*, which we suppose is the original one given to it by Broussonet.—18. CESTRUM *macrophyllum* Vt. from Porto Rico. It approaches too near to C. laurifolium, though M. Ventenat is inclined to consider it as a distinct species, on account of its flowering in the beginning of autumn, its quite sessile milk-white flowers, its leaves being but little coriaceous, and the stamens being constantly furnished with a small tooth. How far these differences may be sufficient to make the Cestrum macrophyllum distinct as a species, we must leave for those to decide who have an opportunity of observing both the plants alive.

4me Livraison.

19. CORYDALIS *fungosa.* The Fumaria fungosa of the Hort. Kew., a fine plant, not before figured, is under this name given as a separate genus, after Gærtner, who, chiefly from a diversity in the fruit, divided the former genus into three, viz. the Cystocarpus of Boerhaave, and the Fumaria and Capnoides of Tournefort (vid. Gærtn. Sem. 2. p. 161. 63.) The last of these three genera is Ventenat's *Corydalis*, an old name applied by Dillenius to Fumaria vesicaria, and by Linnæus to a whole order, which contains Fumaria.—20. HELIANTHEMUM *alyssifolium.* Cistus alyssoides of Pourret and Lamarck, met with in France in the Department de la Sarthe. To judge from dried specimens, it appears to come very close to C. cheiranthoides Lam. In retaining the genus Helianthemum of Tournefort, M. Ventenat follows Jussieu and Gærtner, according to whom it differs from Cistus not only by the fruit, which is one-celled and three-valved, but also by the seeds being attached to a projection in the middle of the membrane lining the valves, and by the radicle being slightly curved upon the lobes; while the capsule of Cistus has generally five, sometimes ten cells, and as many valves, the seeds fixed to the interior angle of the cells, and a filiform spiral embryo.—21. CISSUS *antarcticus* Vent. foliis ovatis laxe serratis glabriusculis subtus glandulosis. A sarmentose species from New Holland, known in the gardens by the name of the Kanguru-Vine, and here referred to Cissus, with which it agrees better in character than with Vitis, especially in regard to the number of the parts of fructification. But as the genera Vitis, Cissus, and Michaux's Ampelopsis now stand, it is in many cases difficult to decide to which of them an individual of the tribe belongs.—22. BUMELIA *reclinata.* The Sideroxylum reclinatum of Michaux, which, we are told, together with Sideroxylum Lycioides Linn., should

be referred to Bumelia, on account of their fruit being a one-seeded drupe, instead of a berry with five seeds. The species here described and figured, a native of Georgia, resembles the Lycioides, but differs in having very long branches, curved in arches towards the ground, as also in its much smaller oblong-oval leaves.—24. CONVOLVULUS *scoparius* Hort. Kew., which, with the *C. floridus* (both growing naturally in the Canaries) yields the true Rosewood. M. Ventenat suspects that these species may hereafter constitute a genus of their own, from the fruit, which appears to be an unilocular capsule, opening at the base, and containing a single seed.

5me Livraison.

25. NOTELÆA *longifolia*. A new genus of the natural order of Jasmineæ: its essential character consists in the corolla having four short oval petals, two four-cornered filaments, each bearing two anthers, and a fruit, supposed from the inspection of the ovary to be a drupe. This character M. Ventenat deems sufficiently important to keep Notelæa distinct from Chionanthus, Olea, Linociera, and Fontanesia. We are, however, not quite of the same opinion, and regard this plant, which has also flowered at Kew, as a species of Olea. For, if we consider that the corolla, consisting of one or more petals, affords a character of little value in this tribe of plants, and that what M. Ventenat calls two anthers, is in fact nothing more than two loculaments of one and the same anther, standing separate, as in many Justicias; and, finally, that it is almost impossible in these plants to judge, from the appearance of the ovary, of the nature of the subsequent fruit, there can scarcely be any ground for separating it from Olea, with which it also agrees in habit. The shrub here described and figured is an elegant evergreen, and a native of the

South Sea. We see hardly any difference between it and the Olea apetala of Bot. Repository. M. Correa has observed that in this, as in all the plants of the natural order of the Jasmineæ, in which vegetation is suspended during winter, the extremity of the branch perishes, and that the two gemmæ at its base then terminate the shoot of the year.—26. CLITORIA *heterophylla* Lam. A woody plant with light blue flowers, marked with a yellow spot in the middle; the leaflets variously shaped, some rounded, about two lines in diameter, others oval and rather longer, and others again lance-shaped or linear, an inch long or more. By this character, added to the want of stipules, and the presence of lance-shaped bractes at the base of the calyx, C. heterophylla is distinguishable from C. ternata.—27. MIMOSA glandulosa Mich. petiolis inter pinnarum paria glandulosis, floribus capitatis, pentandris, leguminibus falcatis. A new species of the division, *foliis duplicato-pinnatis* (*inermes*), discovered by Bartram on the borders of the Mississippi, and by Michaux on those of the Tenassée.—28. MIMOSA *horrida*, another North American species of the same division, but aculeated. It seems to be the same with the M. microphylla of the Banksian herbarium; and, were it not that the countries, in which the two species are found, are so remote from each other, we should be inclined to pronounce it to be the same with M. quadrivalvis, of which, however, we have seen only an imperfect dried specimen.—29. AMSONIA *angustifolia* of Michaux's Flora Bor. Americana is the Tabernæmontana angustifolia of H. Kew. The genus Amsonia, already established by Walter, was united by Linnæus with Tabernæmontana. Both are here said to be quite distinct by the nature of the folliculi, which are short, ventricose, and horizontally diverging in Tabernæmontana, but straight, cylindrical, very long, and little diverging in Amsonia.—30. INDIGOFERA *diphylla* Vt. appears to be allied to I. arcuata Willd., though it is easily distinguishable from this species by its branches not being angulated, its leaves not ternate, nor its pods four-cornered. The specific phrase, as the French botanists call it, is this: I. petiolis diphyllis, foliolis ovalibus inæqualibus subasperis, leguminibus arcuatis compressis.

XXVII. *Novæ Hollandiæ Plantarum Specimen, auctore* JACOBO JULIANO LABILLARDIERE, *Instituti Nationalis Socio.* Tom. i. Fasc. 1—4. Parisiis ex Typographia Dominæ Huzard. 1804. 4to. maj. (pret. cujusvis Fasciculi cum tabb. 10 æneis, 8 fr.)

ALTHOUGH, according to the best information we possess respecting the discovery of New Holland, some part of its coasts, especially the western, was visited by Dutch navigators early in the seventeenth century, yet no traces are to be met with of any natural production having been brought from thence to Europe till many years after that remote period. The first introduction upon record of any subject of natural history from that vast continent, is that of two shells, sent in 1698 to Dr. Lister, by Mr. Witsen, burgomaster of Amsterdam, who received them from a captain, in the service of the Dutch East India Company, just then returned from the west coast of New Holland. In his letter, communicated by Dr. Lister to the Royal Society, mention is made of black swans, and of an immense number of large rats with pouches (a small species of Kanguru), the origin, as we believe, of the name of *Roten-nest*, given by the Dutch to a group of islands on the south-west coast.

As for the vegetable productions of that quarter, there

appears

appears to be no account of these before Dampier, who on his return from the west coast, about the year 1700, first brought dried specimens of plants to England, which he communicated to Dr. John Woodward, Gresham professor of physic. Figures of a few of them are found in the journal of his voyage, and also in Plukenet's Almatheum (Appendix, tabb. 450. f. 7, 452. f. 4, 453. f. 2, 454. f. 6.).

For more than sixty years after this, our knowledge of the productions of that country remained without further accession, until the philosopher, whose name must ever continue inseparably associated with New Holland, and the first European colony established there, returned from visiting the eastern coast of that continent, with his able coadjutor and friend Dr. Solander. His vast collection of natural productions, and especially of dried plants, with complete descriptions and excellent delineations, both made on the spot, now opened as it were a new world to the naturalist, and to the botanist in particular; for these treasures, so ardently expected, although not as yet committed to the press, have by no means been lost to the public, having, by their liberal possessor, been rendered easily accessible to every one desirous of informing himself in the natural history of New Holland. Still, however, for the sake of those, whose situation will not permit them to take advantage of this indulgence, we will hope that, at a future day, the utility of this collection may be more widely extended by publication, and that thus the wishes of the curious to become better acquainted with the plants of a part of the world, where nature appears to work as it were after new models, both in her animal and vegetable creation, will not be disappointed. From the period just alluded to, but especially after a free communication with New South Wales was opened by the establishment of a colony there, the eyes of all cultivators of curious plants have been directed towards this interesting country, the vegetable productions of which soon became more sought after than even those of the Cape; the old adage "*Semper aliquid novi ex Africa,*" being forgotten in the still more striking novelties of Australasia.—The first plants introduced from thence into European conservatories, were, we believe, *Casuarina torulosa* and *stricta, Eucalyptus obliqua,* and *Leptospermum lanigerum.*

All the figures of New Holland plants hitherto published (and their number exceeds 200*), have been, with few exceptions, drawn either from garden or dried specimens: the former are chiefly contained in the Botanical Magazine, the Botanist's Repository, the Jardin de la Malmaison, Jardin de Cels, and Choix des Plantes. Those given by the late Cavanilles, in his usual style, are made from dried specimens communicated to him by Don Luis Née, the botanist who accompanied Captain Malaspina on his voyage round the world, and from whose own labours we might reasonably have expected detailed descriptions, or figures made on the spot, and consequently more satisfactory than those we now possess of them.

The first work treating exclusively on the plants of that part of the world, but which we regret has not been continued, is Smith's *Specimen of the Botany of New Holland,* the figures of which were drawn in that country, and the descriptions made from well preserved specimens. The next well executed drawings, though not all of them from original living plants, are those communicated by the author of the work before us, in his journal of that pious expedition in search of La Perouse, undertaken in 1791, under the command of admiral d' Entrecasteaux. M. Labillardière was, long before that publication, known as an ingenious travelling naturalist by his Decades of Syrian plants; and his reputation will certainly be further extended by the work now under our review, which is to contain descriptions and delineations of such plants as the author found in those parts of New Holland that were visited by him; namely, Van Diemen's Island (here always called Caput Van Diemen), where the ship twice anchored; and Van Leuvin's land, at the south-west coast, in 33° 55′ S. lat. and 119° 32′ E. long. (from Paris), a part of the country which, though its soil seems less favourable to vegetation, still exhibits a considerable number of plants peculiar to it. Those to be given in this work amount to 270, the greatest part of which have not been before described: they will make two volumes, in twenty-seven fasciculi, which the author proposes to publish in regular series, without interruption. The figures are outlines, having, however, some parts finished, such as the flower and fruit; a method by which the figures, without being materially deficient in elegance, answer all the useful purposes of completely shaded delineations, at least when executed in so clear and expressive a manner as in the four first fasciculi before us. It appears, however, from the name of the designer, that they were not made on the spot.

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* Mr. Dryander has promised to favour us with a complete list of the New Holland plants hitherto published, which we shall give in the next number of the Annals.

In the preface to the first number, the author expresses his gratitude to two gentlemen who have been instrumental to the publication of his work: "His evulgatis, si quid boni consequitur in scientiæ emolumentum, non taceam prodita hæc non fuisse in lucem, si mihi defecissent beneficia illustr. D. Chaptal, dum erat minister rerum internarum, eminentissimique D. de Champigny, ejusdem successoris." Time and circumstances probably prevented M. Labillardière from making the acknowledgments that were due in another quarter; for we know that both for the appearance of the journal of his voyage, and whatever has hitherto resulted from the scientific researches made on that expedition, the public are entirely indebted to the disinterested liberality of the President of the Royal Society, who having obtained possession of the effects of the author, that had fallen by the chance of war into the hands of the English, soon after (in 1791) transmitted the whole collection, consisting of more than twenty large cases, to the original owner in Paris.

We proceed to examine the contents of the four first numbers, which comprehend the classes Monandria, Diandria, Triandria, with part of Tetrandria of the Linnean System, according to which the whole is to be arranged. The forty species contained in them are almost all new; and, to judge from such as we have had an opportunity of comparing with those before us, accurately described and figured; though it must be confessed that the descriptions are often more concise than we could have wished.

Monandria Monogynia.

CENTROLEPIS.—A new genus of the natural order of Junci, of which the following is the essential character:

Spatha multiflora. *Calyx* 0. *Cor.* 0. *Glumæ* centrales, simplices. *Capsulæ* triloculares, loculis monospermis.

The name is derived from κεντρον centre, and λεπις scale, the glumes or scales being central. The species here described, a very handsome little plant, is

C. *fascicularis*, subacaulis, foliis setaceis, subciliatis, dimidio brevioribus scapis. Tab. 1. *Hab.* in Cap. van Diemen.

The style, generally divided into three, is sometimes found to be two-cleft only; in which case the capsule has no more than two cells. We have seen in the Banksian collection another species closely allied to *fascicularis*, but still differing in several respects. The fruit appeared to us quite different from what M. Labillardière describes it. More may perhaps be said of it at another opportunity.

Digynia.

MNIARUM *pedunculatum*, pedunculis semipollicaribus, tab. 2.—A species distinct from *muscosum* or *biflorum* Forst. not only, as here observed, in the proportion of the parts, but also in having leaves irregularly sawed, when seen through the microscope, and more awl-shaped than the other. But the long peduncles distinguish it at once. It is a native of Van Diemen's Island. We have seen it in the Banksian herbarium, from the same part of the world, collected by the late indefatigable David Nelson.

Diandria Monogynia.

PIMELEA. Of this handsome genus six species are here described. All of them yield a very tough and supple bark; whence they are made use of by the natives for manufacturing cordage. We give their names with the specific differences:

P. *ligustrina*, foliis ovato-lanceolatis, capitulis terminalibus axillaribusque involucratis. Tab. 3.

P. *spathulata*, foliis spatulatis, glabris, capitulis involucratis. Tab. 4.

P. *ferruginea*, foliis ovatis subtus ferrugineis, capitulis involucratis. Tab. 5.

P. *nivea*, foliis ovatis revolutis, subtus niveis. Tab. 6.

P. *drupacea*, foliis ovato-oblongis, infra pilosis, fructibus drupaceis. Tab. 7.—This species has the peculiarity that its fruit never remains invested with the base of the corolla, which is persistent in the others, but in this bursts and drops off.

P. *clavata*, foliis lanceolatis, capitulis pedicello clavato axillaribus terminalibusque. Of this is given a description, but no figure.

All these species are natives of Van Diemen's Island, except the third, which is of Van Leuwin's Land.

UTRICULARIA *dichotoma*, scapo nudo, squamulis basi solutis, capsula globosa. Tab. 8. *Hab.* in C. Van Diemen.—The colour of the flowers is not mentioned in the description.

Diandria Monogynia.

GENOSIRIS.—A new genus, said to belong to Jussieu's natural order of Irideæ, whence it has derived its name. The essential character is thus given: *Corolla* (*Calyx* Juss.) tubulosa, trifida, patens, æqualis, supera. *Stigmata* 3, erectiuscula.

The only species here described is

G. *fragilis*, scapis multifloris brevioribus foliis filiformibus, compressis. Tab. 9. *Hab.* in C. Van Diemen.—The author observes that it comes nearest to Ixia; from which however it differs chiefly in the number of the laciniæ of the corolla or calyx, and the detached receptacle of the seeds.

XYRIS *operculata*, foliis lineari-subulatis, capitulo globoso multifloro, petalis alternis penicilliformibus. Tab. 10. *Hab.* in C. Van Diemen.

This specific difference is not very characteristic; it would therefore have been more proper to have introduced the character of the capsule, having its valves united by a lid, which we suppose has not been observed in other species. The three small subulate bodies, alternate with the petals, and which may perhaps be considered as abortive stamens, are here described as "petala tria minora."

LEPIDOSPERMA.—This genus, we apprehend, has too few characters peculiar to itself, or too slight, to be kept separate from Scleria; for the divided scale at the base of the seed, from which the name of the new genus is derived, exists in most of the species of the latter genus that we have examined, many of which also appeared polygamous, and therefore not even in this respect sufficiently distinct from the Lepidospermata. Of this genus, which is thus characterized: *Paleæ* simplices, varie imbricatæ, inferiores steriles; *squama* suberoso-medullacea, 3—6-partita ad basin seminis nucamentacei: the following species are given:

LEPIDOSPERMA *elatior* (for what reason is this word considered as feminine?): panicula laxa subsecunda, vix altior foliis serrulatis. Tab. 11.

L. *gladiata:* panicula contracta, foliis ensiformibus integerrimis. Tab. 12.

L. *longitudinalis:* panicula elongata, medulla foliorum intercepta dissepimentis longitudinalibus. Tab. 13.

L. *globosa:* spiculis subglobosis, squamæ laciniis obtusis. Tab. 14.

L. *filiformis:* culmo filiformi, tereti, longiori foliis subcompressis. Tab. 15.

L. *squamata:* panicula contracta, stolonibus squamatis. Tab. 16.

L. *tetragona:* foliis tetragonis, panicula subexpansa. Tab. 17.

All these species are natives of Van Diemen's Island.

Of SCHŒNUS we have three species:

S. *acutus:* culmo nudo, ut et folia spathaque, compresso. Tab. 18.

S. *filum:* culmo tereti folioso, paniculæ elongatæ spathis foliisque superne capillaribus. Tab. 19. Both natives of Van Diemen's Island.

S. *lanatus:* culmo tereti subnudo, palearum marginibus lanatis. Tab. 20.—The dissection, fig. 1. conveys no clear idea to us. *Hab.* in Terra Van Leuwin.

Digynia.

AGROSTIS, likewise with three species, all from Van Diemen's Island.

A. *ovata:* petalo exteriore inter lacinias aristato, panicula ovata coarctata spiciformi. Tab. 21. This is certainly Forster's *ovata*; and both description and figure are good, but that the panicle in those specimens which we have seen is much more oval than here represented. Is this really a species of Agrostis?

A. *quadrifida:* foliis setaceis, panicula coarctata, valvulæ exterioris corollæ arista tortilis inter lacinias quatuor terminales. Tab. 22.

A. *virginica:* panicula contracta, mutica, foliis bifariis involutis, calycibus longitudine corollarum. Tab. 23. This is a *planta litoralis*, and therefore very general. It is not yet ascertained if *Agrost. pungens* of Schreber, and that of Cavanilles and of other authors, be not slight varieties only of the virginica; nay, even the original *Uniola spicata* appears but little different from it. Future observations must throw light upon these doubts.

Uniola has one species, a native of Van Diemen's Island:

U. *distichophylla:* spiculis alternis tribus ad quatuor, foliis distichis. Tab. 24. Not unlike in its foliation to Agrostis virginica.

Festuca. The three very handsome species here given are all from Van Diemen's Island:

F. *pectinata:* spiculis distichis divaricatis subsessilibus multifloris mucronatis, maturis retroflexis. Tab. 25.

F. *scabra:* spiculis sessilibus, multifloris aristatis remotis subappressis. Tab. 26.

F. *litoralis:* panicula erecta, spiculis muticis vix calyce longioribus, foliis involutis interne pilosis. Tab. 27.

Bromus with one species:

B. *arenarius:* villosus, panicula secunda patula, spiculis oblongis quinquefloris. Tab. 28. *Hab.* in Terra Van Leuwin.

Stipa. Two species from Van Diemen's Island:

S. *elegantissima:* aristis nudis, pedicellis plumosis. Tab. 29. and

S. *flavescens:* aristis nudis, corollis pilosis, foliis involuto-filiformibus.

AVENA. The generic character is thus altered:—*Cal.* gluma bivalvis, uni- aut multiflora. *Cor.* oblonga, bivalvis, valvula exterior aristata, arista dorsali contorta.—Two species from Van Diemen's Island:

A. *filiformis* Forst. Tab. 31. (the Agrostis avenacea of Gmelin), with the specific character of Forster's Prodromus; and

A. *quadriseta:* panicula spiciformi, calycibus unifloris, corollarum valvula exteriore quadriseta. Tab. 32.

Of ARUNDO we have two new and one known species, all very distinct, and natives of Van Diemen's Island.

A. *semiannularis:* calycibus quinquefloris, panicula subcoarctata, corollarum valvula exteriore pilis semiannulata. Tab. 33. A very handsome species: the outer valve of the corolla is furnished on its back with beautiful long silky hairs, which however do not appear to us to be so disposed as to give the idea of a semiannular form.

A. *penicillata:* calycibus quadri- octofloris, corollæ valvula exterior penicillis binis utrinque marginata. Tab. 34.

A. *poæformis:* spiculis quinquefloris compressiusculis, panicula subcoarctata vix altior foliis involuto-subulatis incurvis. Tab. 35. Forster's Poa anceps, which we have not seen, is given as a synonym, though doubtful.

Tetrandria Monogynia.

The genera of the natural order of the Proteæ have received an accession in ADENANTHOS (αδην glandula, ανθος flos):

Cor. quadrifida, basi cincta squamis imbricatis. *Anth.* lineares, laciniis insertæ infra apicem. *Sem.* unicum superum, tectum corolla emarcida, infra circumscissa, glandulisque squamiformibus quatuor ejusdem corollæ basi intus affixis.

Of this we have three very fine species, one of them (A. sericea) different in habit from the others, but agreeing perfectly in the structure and disposition of the flowers, which stand single or few together, either axillary or terminal. They are natives of Van Leuwin's Land.

A. *cuneata:* foliis cuneiformibus sericeis superne crenatis. Tab. 36. We have seen dry specimens of a new species somewhat similar to this, from the same place.

A. *obovata:* foliis ovatis inferne attenuatis trinerviis, nervis utrinque confluentibus. Tab. 37.

A. *sericea:* foliis ternatis decompositis filiformibus teretibus sericeis. Tab. 38. The corolla (or rather *calyx*) of this species affords another proof that the mono- or polypetalous nature of that organ is not of great moment in this family: we here see four laciniæ at the top, and a separation into as many parts at the base, while they are intimately grown together in the middle: no mention however is made of this circumstance in the description.

Of Hakea, which is Smith's *Conchium*, we have likewise three new species:

H. *ruscifolia:* foliis sparsis ovatis mucronato-pungentibus utrinque attenuatis, capsulis obovatis. *Hab.* in Terra von Leuwin. Tab. 39.

H. *Epiglottis:* foliis alternis teretibus mucronatis, capsulis reflexis subcordatis mucronato-replicatis. *Hab.* in Terra van Diemen. Tab. 40.

H. *clavata:* foliis alternis clavatis mucronatis, capsulis bicalcaratis. *Hab.* in Terra van Leuwin. The figure of this last will be the first of the fifth fasciculus, which is to contain the rest of the class Tetrandria, and of which we shall give an account in some future number.

MISCELLANEOUS ARTICLES.

ACCOUNT OF A NEW INTERESTING SPECIES OF FUCUS, COMMUNICATED BY D. TURNER, ESQ.*

Fucus *tenax* fronde teretiuscula filiformi subgelatinosa lubrica: ramis subdichotomis patenti-divaricatis, summis reflexis acuminatis.

Habitat in mari Sinensi.

Radix callus aliquantulum explanatus, lutescens; frondes cæspitosæ, sesquipollicares, crassitie ut plurimum fili emporetici, interdum tamen pennam corvinam æquantes, teretes, vel hic illic modice, et quasi casu, compressæ, a radice statim divisæ; rami nunc dichotomi, nunc vagi, filiformes, patentes vel divaricati, nec raro horizontales et reflexi, summi semper divaricati, reflexi, apicibus acuminatis: fructus verruciformis; capsulæ scilicet hemisphæricæ, subdiaphanæ, seminibus minutissimis rufo-fuscis constipatis repletæ, ramis omnibus undique et ubique insident; substantia tenerrima, tactu lubrica, subgelatinosa; color aquose purpurascens, citissime, si planta in aqua dulci retineatur aut aeri exponatur, in albo fuscum et tandem in album transiens.

This Fucus cannot but be regarded as peculiarly interesting, from the circumstance of its being in very extensive use among the Chinese, by whom it is employed for all those purposes to which gum and glue are here deemed applicable. For this information, as well as for specimens, I am entirely indebted to that great patron of all science Sir

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* We should have inserted this communication in the preceding part of the present number, had it not been for the lateness of its arrival.—Ed.

Joseph Banks, who sent me the plant some time since, and at the same time suggested whether it might not be possible to find some British species possessed of the same quality. From similarity of texture, habit, and substance, I have not the smallest doubt but this is the case with *F. kaliformis, clavellosus,* and *asparagoides,* as well as with *Ulva rubens, filiformis,* and *furcellata*; but at present I have not had the opportunity of meeting with any of these plants in a recent state to make the experiment, nor is it probable they occur on any part of our shores in sufficient quantity to render the collecting of them otherwise an object than as a matter of curiosity.

The Chinese, in using *F. tenax,* do nothing more than carefully wash off the saline particles and other impurities, and then steep it in warm water, in which in a short time it entirely dissolves, stiffening, when cold, into a perfect gelatine, which, like glue, again liquefies on exposure to heat, and makes an extremely powerful cement.

There are indeed few of the submersed Algæ which are not possessed of some degree of viscidity, and many of our British Fuci will in great measure, if not entirely, melt, when boiled in water over a quick fire, especially *F. ciliatus* and *crispus**, both which, on cooling, form into a gelatine resembling glue in appearance, but, unfortunately, by no means in tenacity, of which they are altogether destitute; nor have I found them applicable to any purpose, except to the fixing of those sea weeds on paper, which do not of themselves possess a sufficiently adhesive quality. For this purpose they are admirably calculated, as they impart no stain like glue, or glare like gum; nor is any thing more necessary than to rub over with them the paper on which the specimens are to be expanded, and the membranaceous species will, by pressure, be fixed so firmly as to be afterwards inseparable.

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* The experiments on these plants were made by Mr. J. D. Downes, of Yarmouth, who also discovered their use in affixing other Fuci on paper.

In the course of the present summer I will prosecute this inquiry further, and I trust that other naturalists will not consider it unworthy of their attention. I am not aware that there is any Fucus either in the British or foreign catalogue for which *F. tenax* can be mistaken; it belongs evidently to the division *fronde tereti*, and approaches in fruit very nearly to *F. confervoides*, but in habit, form, and substance, much more closely to several Ulvæ, and, had it only been found in a barren state, would certainly have been arranged with that genus.

BOTANICAL DISSERTATIONS PUBLISHED IN THE UNITED STATES OF AMERICA.

At the close of the eighteenth century only five dissertations, it is believed, had been published by the medical graduates of America on botanical subjects: viz. On the *Persimmon-tree*, by Dr. Woodhouse; on the *Tobacco-plant*, by Dr. Brailsford; on the *Phytolacca*, or *Poke*, by Dr. Schultz; on the *Stramonium*, or *James-Town-weed*, by Dr. Cooper; and on the *Sumack*, by Dr. Horsefield, all of the United States.

Since that time publications of that kind have considerably multiplied. The learned and interesting lectures on botany, delivered by Dr. Barton, of the university of Pennsylvania, and his enlightened zeal in pursuing this branch of science, have produced a very sensible effect in recommending it to the attention of the students in the seminary. In the course of the last three years (till 1803) the following dissertations on botanical subjects have been added to the former small list:

1. On the *Digitalis purpurea*, by John Moore, of Pennsylvania.

2. On the *Kalmia latifolia* and *angustifolia*, by George Thomas, of Virginia.

3. On the *Melia Azederach*, by Grafton Duval, of Maryland.

4. On the *Prunus Virginiana*, by Charles Morris, of Virginia.

5. On the *Liriodendron tulipifera*, by Patrick Rogers, of Ireland.

6. On the *Magnolia glauca*, by Thomas D. Price, of Virginia.

7. On the *Spigelia Marilandica*, by Hedge Thompson, of New Jersey.

8. On the *Sanguinaria Canadensis*, by William Downey, of Maryland.

9. On the *Bignonia Catalpa*, by Robert Holmes, of Virginia.

10. On the *Polygala Senega*, by Thomas Massie, of Virginia.

11. On the *Arbutus Uva Ursi*, and *Pyrola umbellata* and *maculata*, by John S. Mitchill, of Pennsylvania.

12. On the *Cornus florida* and *sericea*, and the *Cinchona officinalis*, by John M. Walker, of Virginia.

Some of these academic publications have great merit: they afford conclusive evidence, that this department of natural history is more studied in the middle and southern, than in the eastern states.—*Miller's Retrosp. of the* 18*th Cent. New York.*

BOTANICAL GARDEN IN NORTH AMERICA.

The late royal government of France, for the promotion of botanical science, was in the habit of establishing *botanical gardens* in various parts of her colonies, and of foreign countries. A piece of land of moderate fertility and extent, hired or purchased at the public expense, served, in the distant country where it was situate, as a home for a botanist,

tanist, a repository for the seeds he might collect, and a nursery for the plants he should cultivate. From establishments of this nature in distant regions, rich treasures of botanical specimens and information have been transmitted to France.

The late king of France provided two gardens of this kind in the United States; one in Bergen county, in the state of New Jersey, within eight or nine miles of the city of New York; the other in South Carolina. The botanist employed to superintend these, and to perform all the duties of a botanical pensionary, was the late M. Andrew Michaux.

The first person who conceived and carried into effect the design of a botanical garden, for the reception and cultivation of American vegetables, as well as exotics, was the celebrated John Bartram. His establishment, though small, and scarcely worthy of the name, when compared with those of Europe, was respectable, considering the situation of the proprietor, and is now probably the best in the country. Those formed and supported by the French government, though calculated to answer the purposes intended, were also far from being regular or complete botanical gardens. Nothing that deserves this character has yet been established in America. It is hoped the plan now in execution, by professor Hosack, of Columbia college, will be fostered by the public, and succeed better than any former attempts. That gentleman has lately purchased ground for a botanic garden in the vicinity of New York, and is going on, at his own expense, to furnish it with the necessary stores of indigenous and exotic plants, for rendering it a useful and ornamental institution.—*Ibid.*

THE LATE DR. NORONA.

We have already made mention of the fate of this botanist in a note to his paper on the Rasamala, p. 323. of this number of the Annals. The following particulars respecting him have since occurred to us in Cossigny's work on the French colonies. Noroña died at the Isle of France of an obstruction in the liver, contracted at Madagascar, whither he had been led by his love for the science. At his death he nominated M. Cossigny the heir of all his drawings and manuscripts, which that gentleman afterwards presented to the then Academy of Sciences at Paris. This learned body referred them to M. Labillardière, to be prepared for publication; but he was at that time too busily engaged in printing the journal of his own voyage. Perhaps we may see them brought forward at a future opportunity.

The Spaniards have erected a monument to the memory of their indefatigable countryman, in the island of Luzon, near Manilla, on the ground belonging to the royal botanic garden, which, during his residence there, Dr. Noroña had done every thing in his power to bring into order, and to stock with many valuable plants.

JACQUIN'S WORK ON STAPELIÆ, AND CONTINUATION OF HORTUS SCHŒNBRUNNENSIS.

Jacquin, the patriarch of living botanists, who still continues his exertions with unabated zeal, is soon to present us with a monograph on the *Stapeliæ,* containing a great number of new species of that singular genus, cultivated in the imperial garden at Schönbrunn. Proper dissections of the parts of fructification will be added to the figures.

The third volume of that elegant and useful work, the *Hortus Schœnbrunnensis,* will, it is hoped, appear nearly at the same time with the Stapeliæ, the greatest number of the plates being already finished. To those who are not possessed of this very expensive work, nor otherwise acquainted with that celebrated garden, it will not be uninteresting to see the following

SHORT ACCOUNT OF THE IMPERIAL BOTANIC GARDEN AT SCHÖNBRUNN, NEAR VIENNA.

In 1753 the emperor Francis I. appropriated a portion of land behind the pleasure garden of the palace of Schönbrunn, to the purpose of cultivating there exotic, ornamental, and otherwise interesting plants. By the advice of van Swieten, the famous florist Adrian Steckhoven was invited from Leyden to Schönbrunn, where he constructed a great number of conservatories, a very elegant and spacious hot-house, and several other buildings. After this Richard van der Schot, of Delft in Holland, was appointed head gardener, and directed to take with him to Vienna a great number of rare exotics, purchased from the different nurseries of Holland; by which means, in the very first year of its existence, the garden might already be called rich in precious vegetables.

Jacquin, then at Vienna, frequently visited the new garden of Schönbrunn, for the sake of determining such plants as had not yet received a systematic name. This procured him an introduction to the emperor, who proposed to him to undertake a voyage to the West India islands, and continent of South America, for the purpose of enriching the garden with the vegetable productions of those tropical countries. He accordingly set out from Vienna in 1754, accompanied by the gardener van der Schot; and, taking his way through Italy, joined two natives of that country, John Buonamici and Ferdinand Barculli, who had been appointed zoologists to the expedition, with the view of recruiting at the same time the imperial menagerie and museum. After having visited the islands of Martinique, Grenada, St. Vincent, St. Eustatia, St. Christopher, St. Martin, St. Barthelemy, Aruba, Jamaica, Cuba, Curaçao, he returned to Vienna in 1759. From August 1757 till near the middle of 1759, Jacquin was not able to do much for the science, being not only for four months afflicted with the lientery, from which he was at last restored in Jamaica; but meeting with a further obstacle to his pursuits in the war which then commenced between England and France; for, the ship in which he had embarked being taken, he was obliged to pass some time at Montserrat, and the desert island of Gonave.

In August 1755 the first consignment of plants from Martinique arrived at Schönbrunn, by way of Marseilles. In February 1756 van der Schot returned from Martinique with a considerable number more of trees and shrubs; the whole of which arrived in perfect safety, except some species of Heliconia, which were attacked by the mice on the passage. The stems of many of the trees were five or six feet high, and as thick as the arm. Most of them had already borne fruit in their native country. Upon their transportation the trees were deprived of their heads, and about two feet of the principal branches only were left. The shrubs were suffered to remain in their natural state. In removing these vegetables from their native soil, a circular trench was dug at a proper distance round each of them, in order to retain as large a mass as possible of the original earth. The whole of this mass, forming a large ball, was entirely wrapped up in plantain leaves, bound round with cordage made of the bark of Hibiscus tiliaceus, in such a manner that the earth could not be detached. Thus prepared, a single tree generally exceeded a hundred pounds in weight. The balls were moistened from time to time with due care, and the trees suspended in open air, where they soon began to vegetate. To prevent as much as possible all shaking during the transportation, the whole was conveyed in barks to the port St. Pierre in Martinique, and there put on board a ship bound to Marseilles, and thence to Leghorn; from which port the whole was conveyed on mules to Schönbrunn.

In August 1756, Buonamici left the island of St. Eustatia for Leghorn, with the third transportation; the fourth sailed about the same time from Martinique for Marseilles; and the fifth and sixth from Curaçao to Amsterdam in the months of March and August 1757. Jacquin himself, and his companion Barculli, with the seventh, left the Havannah in January 1759, for Ferrol, and arrived at Vienna in the month of July. These cargoes, beyond contradiction, formed one of the richest collections of plants ever transmitted from the tropical countries to Europe. The new garden, by this accession alone, could now vie with almost any other institution of the kind: but besides these consignments from America several other considerable acquisitions had been made in different countries.

In 1765, after the demise of the emperor Francis I, Maria Theresa ordered the establishment to be continued on the same footing, and with the same munificence, as before. A short time prior to the death of the empress, in 1780, the garden sustained a considerable loss; for van der Schot, then very far advanced in years, being confined to his room for several weeks by a fit of the gout, the care of the garden was so much neglected, that, in one of the coldest winter nights, the person to whose care the large hot-house was intrusted, forgot to keep up the fire, and, to make amends for this omission, in the morning heated it so much the more. By this sudden transition from cold to heat, a considerable number of the most beautiful and valuable plants were destroyed, among others all the Cinnamons from Martinique, with stems the thickness of the arm, and in the most flourishing state imaginable; several species of *Crescentia*, *Achras*, *Annona*, *Portlandia*, and a *Coccoloba grandifolia*, twenty feet high, with leaves two feet in diameter. About the same time another misfortune befel the garden, in the total loss of a considerable collection

tion sent from the Isle of France by Mr. Céré. Upon its arrival at Trieste, the trees were all dead, and the seeds incapable of vegetating.

In the mean time the emperor Joseph II. having directed Jacquin and Born to propose some able naturalists to undertake a voyage to distant countries, professor Märter was appointed director of this expedition: his associates were Dr. Stupicz, the gardeners Boos and Bredemeyer, and Mr. Moll, the draughtsman. They quitted Vienna in April 1783, and arrived in September following at Philadelphia, from whence they made excursions into Pennsylvania, Virginia, and Carolina. In the last state Dr. Märter joined the well known Dr. Schöpf, with whom he undertook a tour into Florida, and thence to the Isle of Providence. Mr. Bredemeyer returned from Carolina to Europe by way of England, and arrived at Vienna in November 1784, with a very fine cargo of plants. Boos, who during a residence of eight months in the Bahama Islands had collected many rare plants, returned to Vienna in 1785; but Mr. Moll the draughtsman, and Dr. Stupicz had separated from the other travellers.

Towards the end of 1784, Mr. Bredemeyer and the gardener Schücht set off, by order of the emperor, to join the director of the former expedition, professor Märter, who still remained in America; and in this journey visited several of the large islands, and a part of the continent as far as the mouth of the Oronoko, returning in 1788 by way of Amsterdam to Vienna, where professor Märter also arrived, in the same year, with a collection of vegetables, having visited London and Brussels in his way home.

To make up for the former loss of the plants from the Isle of France, the emperor ordered Mr. Boos and the gardener Scholl to go thither as collectors. They arrived at the Cape of Good Hope in May 1786, from whence Mr. Boos departed alone in 1787, for the Isles of France and Bourbon, and returned to the same place in January 1788, with 280 boxes filled with scarce plants. In July of the same year he arrived at Vienna with a great cargo of showy plants: as however all the boxes could not be taken proper care of on board the ship, the gardener remained at the Cape with the residue. Scholl has since occasionally sent home bulbs and seeds; but not long ago no opportunity had offered of sending the living plants brought from the Isles of France and Bourbon.

Besides these different acquisitions, the garden at Schönbrunn received a number of plants from other sources: thus, at the sale of Schwenk's collection, at the Hague, the emperor caused all the rare plants to be bought; and Mr. Jacquin, the son, then on his journey through the greatest part of Europe, likewise sent home a considerable number of exotics.

The emperor likewise caused the old hot-houses to be enlarged, and several new ones to be erected. To give Scholl an opportunity of returning to Vienna with the plants which yet remained at the Cape, the emperor Leopold, in 1791, ordered the gardener Bredemeyer, and the young van der Schot, son of the same who had accompanied Jacquin to the West Indies, to repair to the Isle of France, where M. Céré had made a considerable collection for the imperial garden; and, on their way home, to touch at the Cape, in order to give Scholl an opportunity of returning to Vienna with the plants which still remained there under his care. The captain of the ship, however, who was to take them out, made sail for Malaga, where they discovered, in good time, that his intentions respecting them were none of the fairest. This circumstance obliged them to return to Vienna, without having been able to fulfil their commission.

After the death of the emperor Leopold, his successor Francis II. caused a new conservatory to be constructed, 235 feet in length, destined exclusively for the preservation of Cape plants. A new garden was also laid out for the cultivation of all such as are indigenous to Austria, of which Dr. Host was appointed director.

From this short abstract it will appear what care has been bestowed, ever since the reign of the emperor Francis I., upon this justly renowned garden, which has furnished the materials of several splendid works, such as *Icones plantarum rariorum*, *Plantæ rariores horti Cæs. Schœnbrunnensis*, and the *Fragmenta botanica* of the celebrated director of that institution.

TRANSLATION OF A LETTER FROM DR. TOURNON TO MR. MILLIN, WITH AN UNPUBLISHED LETTER OF LINNÆUS.

SIR,

The collection of letters written by Linnæus, published some time ago, is not very copious, nor does it include any addressed to French botanists, though it is known that he held a correspondence with Jussieu, Sauvages, Séguier, Menard (professor of medicine at Toulouse), Gouan, Aymen (physician at Castillon on the Dordogne). As whatever comes from the pen of this great man cannot fail to be interesting to the naturalist, I send you a copy of one of his letters, written to my learned friend, the late Duvernoy, the loss of whom Toulouse had the misfortune to sustain two years ago. T.

(The motto on his seal is: *Famam extendere factis.*)

Viro clarissimo Domino l'Abbé Duvernoy.
S. D.
Car. Linné.

Literas tuas v. Calend. Martii non ante triduum accepi; me nulli rescribere tibi relatum doleo: certe si decem mihi essent manus non sufficerent omnibus, qui literas mittunt;

et si coram me videres, crederes me nihil aliud agere, quam literas, in quas dilapido et æs et tempus meum.

Isoetem lacustrem, quæ copiosissima est in Suecia, nunquam crederem crescere Monspelii, nisi a te missa fuisset. Dedi ejus descriptionem, figuram et caracterem in Itinere Scanico. In nostratibus non vidi talem radicem qualem tu mihi delineasti, quæ admodum singularis est; cætera conveniunt.

Philosophiam botanicam dudum scripsi lecto detentus æger; aliam traderem hoc ævo nisi senectus me delassaret. Decimam tertiam *Systematis Regni Vegetabilis* partem (*editionem*), quæ hisce diebus prodiit Gottingæ quæso tibi compares (de animalibus 12ª editio Holmensis ultima est) si mihi honorem præstes aliqua ex his vestra lingua edere. Microscopicas tuas observationes lubenter videbo.

Servet D. T. O. te, D. Gouanum, D. Cussonem et reliquos ex Flora fratres Monspelienses in seros annos et in sui gloriam.

Dabam Upsaliæ 1774. d. 6. Maji.

ITALIAN BOTANISTS.

The members of the academy of Turin, after the vicissitudes of the political affairs of the ci-devant Piedmont, have again resumed their labours, and published a volume of their memoirs for the years x and xii. The part assigned to the *Mémoires de Mathématique et de Physique* contains several botanical papers, accompanied by sixteen plates, representing mostly new and rare species of plants.

Dr. Balbis has given his observations on the genus *Dianthus*, with the description of three new species, natives of Piedmont, namely:

D. *alpestris:* floribus solitariis, squamis calycinis duabus cordatis brevissimis, corollis emarginatis, caule erecto. ♃.

This species has been found by Molineri on the pastures of the Maritime Alps.

D. *furcatus:* caule bifloro, squamis calycinis oppositis binis tubo admodum brevioribus.

D. *tener:* caule unifloro, corollis fimbriatis, squamis calycinis plerumque duabus vix calyce brevioribus, foliis linearibus subulatis.

The two last species, likewise discovered by Molineri at the borders of the fields in the mountains of Tende, have been introduced into the botanic garden, where in the space of ten years cultivation they have never varied.

The same botanist has given descriptions and figures of three species of *Marchantia,* the *triandra* and *quadrata* of Scopoli, and a new one called by him *fragrans,* on account of its exhaling a sweet scent of ripe strawberries. The latter species differs from all the other known ones by its peduncles issuing from the centre of the lobes of the leaves, as from a sort of cup beset with very delicate, white, reticulated and fringed scales, resembling those of Illecebrum. These peduncles, which take a blackish colour when old, bear each a head, beset on its lower surface with many scales or bractes, and including three black globules. The strawberry-scented Marchantia is found, with triandra, on a kind of pudding-stone, at the borders of the river Po.

Besides these papers, Dr. Balbis has communicated to the society of Turin, under the title of *Miscellanea botanica,* descriptions of a great number of such rare and new plants as are found in the botanic garden of Turin, or in the territory of Piedmont. Those of the latter may be considered as an interesting supplement to the Flora Pedemontana, which, next to the late Allioni, is highly indebted to the above botanist; as also particularly to professor Bellardi, known by his *Appendix ad Floram Pedemontanam*, and other publications, and who has laid before the same society a paper entitled *Stirpes novæ vel minus notæ Pedemontii descriptæ et iconibus illustratæ*. In this we find, among others, an account of a new genus, called *Suffrenia*, after its discoverer, M. de Suffren, and characterized as follows:

SUFFRENIA. *Cal.* 0, nisi corollam dicas. *Cor.* calycina monopetala, quadrifida, foliolis ovatis acutis æqualibus. *Stam.* Filamenta duo corolla breviora, eidem basi opposite insidentia; antheræ capitatæ. *Pist.* Germen superum, subrotundum: stylus simplex, longitudine corollæ: stigma capitatum. *Per.* Capsula oblonga, unilocularis, bivalvis, valvis subæqualibus acutis.

The plant which forms this new diandrous genus, and which is found abundantly near Vercelli in Piedmont, where it grows at the borders of the rice-fields, is a small tender annual, having the habit of a Callitriche: its small leaves are opposite, oval-oblong, entire; the minute yellowish flowers grow in the axils of the leaves. It appears to belong to the natural family of the *Salicariæ* of Jussieu.

M. LAMOUROUX'S FUCI.

Dissertations sur plusieurs Espèces de Fucus peu connues et nouvelles, avec leur Déscription en Latin et Français, par Lamouroux. 1er Fasc. 1805. gr. 4°.

This work is just arrived. The first number contains thirty-four plates, fourteen of which are dedicated to representations of the different varieties of *Fucus polymorphus*. From the preface it appears that the author has not been acquainted with Mr. Turner's last work on this subject. We shall perhaps give a detailed account of this publication at another opportunity.

OBSER-

OBSERVATIONS RESPECTING THE VESICLES OF UTRICULARIA.

Mr. Hayne, of Berlin, has made the observation that the vesicles at the roots of *Utricularia vulgaris*, *intermedia*, and *minor*, consist of a transparent, tough, horny, and elastic membrane, and are furnished with an aperture, closed by a lid, that only opens outwards. Before the flowers appear, the vesicles are filled with water; but when the plant brings forth the scape, and approaches the time of flowering, the water disappears, and instead of it air is secreted in them, by which means the plant rises to the surface of the water; so that thus the flowers can unfold in open air. But when the time of flowering is over, and the seeds are arrived at perfection, the vesicles again fill with the former fluid, and the plant sinks to the bottom. See Dreve's and Hayne's "*Abbildungen, &c.*" or Delineations and Dissections of German Plants, vol. i. no. 4.

SCHMIDT'S AUSTRIAN ARBORETUM.

We are glad to find that Mr. Francis Schmidt of Vienna continues his useful and elegant work on the exotic and indigenous trees and shrubs to be met with in the Austrian dominions in open air (*Oestereich's Allgemeine Baumzucht*, &c.). The five numbers of the third volume, that have lately appeared, contain 75 plates.

GÆRTNER'S CARPOLOGICAL WORK.

We hear that Dr. C. F. Gærtner, son of the author of the work "De fructibus et seminibus Plantarum," has just published the first number of his *Carpologia, seu Descriptiones et icones fructuum et seminum Plantarum*, being a continuation of the above celebrated work. As the author, a gentleman a gentleman of great botanical and other attainments, on his late tour through France, England, and Holland, has met with all the assistance such an undertaking deserves, we have no doubt but that the hopes entertained of the execution of his task will be fully realised.

DEATH OF DR. POTT.

On the 13th of April died at Brunswick, Dr. John Frederick Pott, first physician to the duke of Brunswick, and dean of the college of physicians, in the 66th year of his age. Though known as a botanical author only through his enlarged edition of Duroi's classical work "*die Harbkesche Baumzucht*," mentioned in our retrospect of botanical literature in the first volume of these Annals, and a few papers inserted in periodical works, he was certainly one of the first-rate botanists of Germany, uniting with an indefatigable zeal for his favourite science, all the qualifications of a nice observer. He has been long engaged in preparing a *Flora Brunsvicensis*, the materials for which we hope will not be lost to the public. Dr. Pott was born at Halberstadt, in the Prussian dominions, in 1738. His skill as a professional man, his integrity, and benevolent disposition, procured him the esteem and love of all his fellow citizens, by whom his memory will long be cherished with affectionate regard.

ERRATUM *in the last number.*

Through a strange oversight, at page 92, lines 2 and 12, and again at page 96, line 4, the name of GOUAN is given to the author of the *Flora Gallo-provincialis,* which ought to have been GERARD.

ANNALS OF BOTANY.

XXVIII. *Some Account of the Vegetable Productions of the Countries situated between the Terek and Kur, Rivers flowing into the Caspian Sea. Extracted from a Description of these Parts by* F. R. MARSCHALL VON BIEBERSTEIN.

THE little work* from which the following extracts are taken, contains, besides an enumeration of the natural productions, a topographical sketch of the countries mentioned in its title, and some account of their governments, antient and modern history, &c.; but we give here only what appertains to the vegetable kingdom, the principal part of which consists of a Latin Appendix, containing specific characters and short descriptions of several plants hitherto undescribed or imperfectly understood, some of which have been lately introduced into our gardens. This Appendix we shall insert at length, premising such observations as we collect from the author, tending to throw light upon the vegetation of that distant part of the old world, of which very little is known to us, from the imperfect descriptions of Gmelin and some other travellers.

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* Beschreibung der Länder zwischen den Flüssen Terek und Kur am Caspischen Meere. Frankfurt am Mayn, 1800. 8vo.

The vegetation of that part of Georgia situated between the rivers Terek and Kur, near the Caspian Sea, is uncommonly diversified, presenting to the botanist an ample field of interesting disquisition and discovery, as might indeed be expected from its southern latitude and very various surface. Such botanists, however, as are acquainted with the plants of the Crimea, will find a great similarity between the vegetables of this peninsula and those of the country under consideration. Nevertheless a considerable number of plants are to be met with in the latter, which would be in vain sought in the Crimea; Mr. von Bieberstein, in his tour, has observed thirty-three phænogamical species, either entirely unknown, or at least so superficially pointed out in the catalogues of old botanical writers, that they have neither been taken up by Linnæus nor any other systematical botanist.

Some idea of the general vegetation of these countries may be obtained by the following observations of this author.

The trees which occur the most frequently in the woods, are the oak, the beech, the elm, the blackthorn, the pear, and two species of crab, viz. the common one, and, in much greater quantity, that with oblong tomentose leaves, called the sallow-leaved crab-tree (*Pyrus salicifolia*). Less frequent are the beech, the common and manna ash, the linden, the cherry, the cornel, the quince, the medlar, the service and mountain-ash. Both the narrow- and broad-leaved oleaster (*Elæagnus angustifolia* and *orientalis*) are far from being scarce; and their sweetish mealy fruit, of the shape and almost of the colour of a date, is sold in the markets of Baku, Schamachi, and Derbent. The oriental plane-tree, called both here and in Russia Tshinar, and known as an excellent fuel, is seldom met with, and in thick forests only. A species of juniper, nearly allied to the savin, and which is likewise found in the Crimea, is common in the mountains, upon rocky precipices exposed to the sun, where it attains a considerable height and size. It will be described hereafter, under the name of *Juniperus excelsa*.

The yew-tree is rarely met with; but the common juniper is more frequent in dry and stony places, on hills, and at the borders of the *stepps*. The birch and the fir are entirely wanting. The chesnut is found towards the loftiest ridges of the mountains, and its fruit sold very cheap all over the country. The white and black poplar, the former of which constitutes the greatest part of the woods along the river Kur, and the alder, with several of the European species of willow, are met with at the borders of swamps, and in moist places.

The Lombardy poplar, as in many other oriental countries, serves to decorate the gardens and public walks of the towns and villages. The pistachia and common turpentine-tree are seen in considerable abundance on the elevated parts along the small river Ata: but in the thicker woods with which the interior of this mountainous tract is covered, these trees disappear.

The pomegranate-tree grows most abundantly on the mountains opposite the town of New-Shamachi, as also on the boundaries between the woody and the bare mountains: in these, its natural places of growth, however, it generally remains a dwarfish shrub, seldom attaining the height of a tree: its fruit ripens in October. There are both sweet and sour pomegranates: the latter are the most common, and may be known from the former by the dark red colour of the rind and their smaller size. The black and the white mulberry grow spontaneously in the woods along the river Kur, but are seldom found elsewhere in a wild state; the few that seem to be so may be rather considered as deriving their origin from the plantations. The vine is extremely common both in forests and in copses, especially in the plain between the rivers Rubas and Ata, and on the borders of the Kur, where it climbs up to the summits of the highest mountains. The fig-tree and the walnut, although seen here and there in the woods, are very scarce, and can hardly be regarded as indigenous.

The shrubs most common in the forests are, three species of hawthorn, among which is the rough oriental one; the sloe, barberry, hazel-nut, viburnum, privet, fly-honey-suckle, dogwood, spindle-tree, elder, buckthorn, and Christ-thorn (*Rhamnus paliurus*). The last of them universally occupies the *stepps* of the elevated tract directed towards the plains or barren mountains; its abundant prickles, which arrest the passenger, have procured it the name of the catching-bush in the Russian language. The narrow-leaved Christ-thorn, a low shrub, which also grows further up the Terek, in the country of the Grebinsky Cossacks, where it is called the sour-bush, is here found in abundance, and might be employed for the purpose of tanning, as the *Rhus cotinus* is in the preparation of Morocco-leather. The Russian box-thorn (*Lycium ruthenicum*) is here and there seen in dry sunny places. The sea buckthorn (*Hippophaë rhamnoides*) decorates the stony borders of the small rivers with its silvery leaves, and in autumn with its profusion of orange-coloured berries, disposed around its branches. Both the round-leaved alpine and the evergreen medlar (*Mespilus pyracantha*) are frequently met with in the copses, where is also observed the true Italian honey-suckle, though not in any considerable quantity.

The common white jasmin is occasionally met with in the ruins of Old Shamachi, but is probably a remnant of the former gardens: the common yellow jasmin (*J. fruticans*) is abundantly seen on sunny and rocky hills. The bladder senna (*Colutea arborescens*) grows here and there in the stony vales of the mountains. A shrub very general in open, stony situations, especially in the *stepps*, is the French tamarisk: in woods it is seldom seen, but when it occurs it is commonly in the form of a tree. It would certainly be worth while, in the salt *stepps* of South-western Russia, where there is so great a want of wood, to try plantations of this arborescent shrub, which appears to thrive best in the very places where other trees and shrubs refuse to grow. The small shrubby horse-tail (*Ephedra monostachya*) here attains an uncommon size, acquiring not unfrequently the height of four feet, with a stem of the thickness of a man's wrist: it is a powerful drug, and is recommended as useful for the cure of dysentery. In the woods of the higher mountains a species of Daphne is found in abundance, which is probably the same with *Daphne caucasica*, of which Pallas in his *Flora Rossica* has communicated a description from the manuscripts of Güldenstädt, without having seen it himself.

Of roses there are several species in the hedges and copses; and in the charming country round Kuba, the author has seen, in the beginning of June, most beautifully in flower, in a wild state, even the true hundred-leaved Rose (*Rosa centipetala*). The common bramble is frequently met with in barren stony places; bearing flowers and fruit till very late in autumn. A very common shrub in sunny and stony situations of the mountains, is the dwarf goat's-thorn, brought first from the Archipelago into France by Tournefort; it is *Astragalus creticus* of Lamarck, who in the Encyclopédie has separated it from several allied species comprised by Linnæus under the name of *A. tragacantha*. The cellular texture of its root is filled with a gum which exudes in spring. The shrub, described by Gmelin, in his journal, as the genuine Chinese smilax, though certainly not this, is a kindred species, namely *Smilax excelsa*. It grows at the foot of trees in the woods, but I found it nowhere except between the rivers Rubas and Samur.

Several shrubby salt-plants of the genera *Salicornia*,

Salsola,

Salsola, and *Anabasis*, cover whole districts towards the sea, especially in the neighbourhood of Baku, and in the plain on the river Kur, where the *Salicornia caspica* attains to six or eight feet in height. They all yield more or less soda[*].

There is no want of wild plants in these regions that might be applied to culinary purposes, and indeed many are found growing spontaneously there, that in Europe are cultivated in the gardens; such as celery, which abounds in moist open places. Fennel is found in the plain by the river Kur, where it often attains a height of upwards of eight feet: there is such an abundance of this plant, that it alone afforded fuel for the space of a fortnight to the army which was encamped in the autumn of 1796 in the neighbourhood of New-Shamachi. Parsnips are met with in different places, together with the palatable alexanders (*Smyrnium perfoliatum*). Aniseed is frequent in the mountains, on the stony borders of the rivulets. The heads of asparagus are cut in abundance every autumn, not inferior in flavour, and in every respect like those cultivated in the European gardens, though not from the same species, but from the *Asparagus verticillatus* of Linnæus, taken up by him from Tournefort only. This species is also indigenous in the Crimea, and even in the southernmost parts of the Ukraine, but has nevertheless not yet been well described or figured by any botanist. The caper-shrub is common enough in places exposed to the sun, where the soil is rich. Hops are found in the fences, and under the bushes along the small rivers and brooks,

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[*] Among other, both shrubby and herbaceous plants, of these regions that can be made use of for obtaining soda, are: *Salicornia herbacea, caspica*; *Polycnemum triandrum, oppositifolium*; *Chenopodium maritimum*; *Salsola fruticosa, glauca, vermiculata, hyssopifolia, prostrata*; *Kali rosacea, altissima, muricata*; *Anabasis aphylla, Echinus*; *Reaumuria vermiculata*; *Aster tripolium.*

The author has observed a species of wheat, both in these regions and in the Crimea, which, even in its wild state, yields very good corn: it will be described under the name of *Triticum pubescens*, in a work which he intends to publish on the plants of Taurida. Madder is found wild, but nowhere in greater abundance, or of better quality, than in the Uzmey district in Dagestan, where the inhabitants dig up the roots, dry and sell them to the Armenian merchants, by whom they are sent in large quantities, partly to Kislar, and partly, by water, to Astracan. The richest of these merchants, now living in the latter city, owes his wealth solely to his trade in this commodity, which sells at Kislar at the rate of from 12 to 15 roubles the pud. Besides madder, several other dyeing plants are found in these parts, such as woad, yellow-weed or wild woad, bastard saffron, *Onosma echioides*, *Echium rubrum*, and *Croton tinctorium* which yields the lacmus.

Of such indigenous plants as might be ornamental in gardens, the following may be worth mentioning: a large autumnal crocus, with blue flowers, which he calls *C. speciosus*, several species of iris, scabious, and narcissus, oriental loose-strife with long red spikes (*Lysimachia orientalis* Lam.), spear-leaved dog's-bane (*Apocynum venetum*), several species of pink, jagged-leaved phlomis (*Phlomis laciniata*), several species of centaurea, such as *C. babylonica*, *splendens*, *reflexa* Lam. &c. The sweet-scented wall-flower (*Cheiranthus odoratissimus* Pall.), distinct from the common in having leaves deeply divided, and dark red flowers, diffusing in the night an excellent fragrance, is above all worthy of a place in European gardens, where, when duly attended to, it would most likely thrive full as well as the common one.

There is no want of very good herbs for pasturage in the mountains and the plains of the province of Kuba. Thus, besides the best grasses, the author observed eight different species of trefoil, four of medick, several species of saintfoin, &c. The mountains abound with different sorts of thyme and germander, with other such aromatic plants as afford the best nourishment for sheep. The same may be said of medicinal plants, among which there are several species of wormwood, both herbaceous and frutescent.

To one of these, the *Artemisia humilis*, the natives ascribe the quality of being injurious and even fatal to horses. This, however, we are here informed, is a mere prejudice, entirely unknown to the inhabitants of the plains between Kislar and Astracan, where, as well as in the countries we are treating of, it is one of the most common plants. That the notion of the fatal effects of this herb is not new, we may learn from Antremont's *Voyages depuis St. Petersbourg dans diverses contrées de l'Asie*, published at Paris in 1766, where, describing the expedition of Peter the Great in these parts of the country, the author relates, that between the rivers Terek and Kur, 500 horses died suddenly in one night, from having eaten of the above species of Artemisia.

The appendix to this work, above mentioned, is as follows:

Caracteres plantarum nunc primum detectarum, vel prius haud sufficienter observatarum et descriptarum.

1. SALICORNIA *caspica.*

S. fruticosa, amentis cylindricis, squamis basi apiceque solutis obtusissimis, flosculis ternis triphyllis.

Salicornia arborescens sine geniculis. *Buxb. Cent.* 1. *p.* 6. *tab.* 10. *fig.* 1.—Salicornia caspica. *Pallas Itin.* 1. *p.* 480. *n.* 90. *tab.* A. *fig.* 2.

Frutex ramosissimus, a 2 ad 10 pedes altus.

Caules lignescentes, cortice cinereo læviusculo, basi nonnihil declinati et statim adscendentes.

Rami adultiores substantia cauli similes, juniores articulati pro more generis. Articuli pro varia ætate, variæ admodum formæ. Vernali tempore nondum florente frutice Salicorniæ herbaceæ simillimi; in ramis floriferis fere cylindrici scilicet basi apiceque perparum attenuati; denique in ramulis qui peracta fructificatione et maturescentibus jam seminibus passim proveniunt, minuti, breves et subglobosi.

Amenta perfecte cylindrica ad apices ramorum et ramulorum oppositorum.

Amenti squamæ duarum oppositionum, basi apiceque solutæ, carnosæ, obtusæ et præsertim postice quasi truncatæ, provecta ætate deciduæ.

Flosculi inter singulas squamas terni ab earum substantia separati; quorum intermedius major in amento florente compacto magis conspicuus est.

Calyx proprius triphyllus, clausus; foliola duo majora, fornicata, succulenta; tertium inferius carinatum, obtusum, minimum, ita quidem ut calyx diphyllus videatur.

Stamina haud vidi.

Semen calyce tectum, solitarium, subglobosum, minutum, atrum.

Occurrit copiose in planitiebus ad Cyrum fluvium nec non alibi passim in locis salsugineis ad littora maris Caspici. ♄.

OBS. Polymorphia articulorum in hac specie probat, Salicornias male secundum articulorum formam definiri: potius ad florum situm et structuram recurrendum est.

Synonymon Buxbaumii certissime ad nostram speciem spectat, quippe de plantis ad Cyrum fluvium, in ipsa, de qua nos quoque loquimur regione lectis, sermo est.

2. VERONICA *peduncularis*. Nova.

V. racemis lateralibus oppositis; foliis ovatis incisoserratis, incisuris basi subdentatis; pedicellis filiformibus, calycibus quadrifidis subæqualibus.

Veronica Chamædryos foliis parvis. *Buxb. Cent.* 1. *p.* 26, *tab.* 41. *fig.* 1.*

Planta perennis, *V. Chamædri* affinis.

Caules e radice nonnulli, basi vix declinati, dodrantales, simplices, teretes, undique villosi, villorum tamen densiorum linea utrinque e petiolorum basi laterali, ad insequentium foliorum axillas excurrente.

Folia opposita, breviter petiolata, cordato-ovata, inciso-serrata; incisuris angustis non acuminatis, sæpe denticulo supra basin lateralem instructis; cæterum utrinque villosa, villis marginis longioribus. *Folia superiora* consimilia, nisi quod paullo longiora et angustiora.

Racemi laterales oppositi, plerumque tantum bini, pedunculati, laxi. *Pedicelli* tenues, elongati, patentes. *Bracteæ* minutæ, oblongæ, integræ.

Flores Chamædri minores.

Calyx quadrifidus, nullo rudimento folioli quinti; laciniis subæqualibus, oblongis, sed non acuminatis, longitudine capsularum.

Corolla, stamina, pistillum ut in V. Chamædri.

Capsula lævis, obcordata, loculis subtrispermis.

Pedunculi, pedicelli, bracteæ, calycesque pubescunt.

Lecta rarius in umbrosis sylvaticis circa Kurt-Bulak. Floret Maio; Junio semina perficit. ♃.

OBS. Differt a *Veronica Chamædri* cui proxima; caule undique villoso, quamvis utrinque lima villorum densiorum existat; foliis utrinque magis villosis, profundius incisis, incisuris sæpius basi postica denticulo instructis; pedicellis magis elongatis; denique calycis laciniis obtusioribus.

3. ZIZIPHORA *serpyllacea.* Nova †.

Z. suffruticosa, racemis terminalibus capitatis, foliis ovato-lanceolatis subserratis, floralibus consimilibus.

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* Veronica pedunculata *Vahl Enum.* 1. *p.* 77.—ED.

† Botanical Magazine, 906.

Suffrutex humilis, habitu Serpylli.

Radix lignosa, valida.

Cauliculi fruticulosi, declinati, pubescentes; rami floriferi adscendentes.

Folia magnitudine foliorum Thymi Acini, ovato-lanceolata, acutiuscula, sæpe serratura una alterave obsoleta instructa, leviter pubescentia, margine non ciliata, subtus nervosa et excavato-punctulata.

Racemi ad ramulorum apices subcapitati, forma Serpylli.

Flores forma et colore Ziziphoræ tenuioris.

Calyx linearis, 10-striatus, pubescens; denticulis quinque parvis subæqualibus.

Corollæ tubus calycem vix excedens. Faux parum inflata. Labium superius breve, obtusum, apice lævissime crenulatum. Labium inferius trifidum; laciniis subæqualibus, lateralibus attamen paullo latioribus, intermedia reflexa vix emarginata. Lineolæ punctatæ saturatiores ad faucem.

Stamina 2, circiter longitudine labii superioris, conniventia, in quibusdam flosculis non raro castrata, scilicet antheras effœtas gerentia.

Stylus adultior labio superiore longior.

Stigma bifidum, acutum.

Planta odoratissima, odore omnino Ziziphoræ tenuioris.

Copiosa ad rivulorum margines lapidosos et in collibus apricis regionis sylvaticæ inter Kubam et Veterem Schamachiam. Floret Junio, Julio. ♄.

Obs. Proxima huic speciei est planta Sibirica, quam in Systemate sub Ziziphora acinoide, deinde sub *Cunila capitata* bis occurrere suspicor. Priorem Linnæus pater jam introduxit, allegato synonymo Clinopodii supini incani *Ammann. Ruth.* 66. posteriorem filius addidit in Supplemento. Utrique patria assignatur Sibiria; utraque Linnæis e siccis tantum speciminibus cognita fuisse videtur: Atqui Ammanni Synonymon aperte ad *Cunilam capitatam* trahi potest, dum perpaucos tantum flores infra caulis apicem prodire, plerosque vero in capitulum terminale collectos esse ipse Ammannus asserit; porro plantæ in horto Demidoviano, qui Mosquæ est, dudum sub Ziziphoræ acinoidis nomine cultæ, quarum specimina coram habeo, nullos plane extra capitulum terminale flores gerunt; denique una tantum eademque species, nec duæ distinctæ et affines, in variis per Rutheniam hortis botanicis colitur e Sibiria transmissa; quibus ergo perpensis, vix dubito, quin vel Cunila capitata, vel Ziziphora acinoides ex recentiorum systematibus sit eliminanda. Bene hanc speciem Sibiricam definit Cl. *Lamarck Tabl. Enc. Bot. n.* 269. sub Ziziphora clinopodioide; sed Cunilam capitatam, autoritate Linnæana adductus, sub n. 273. conservat.

Species nostra Caucasica ab affine Sibirica sequentibus differt: Habitu minore magisque diffuso; foliis minoribus, angustioribus et acutioribus, subserratis; floralibus reliquis nec majoribus, nec insignius nervosis, floribus duplo minoribus, staminibus brevioribus.

4. CROCUS *speciosus*. Nov.*

C. spatha radicali uniflora, foliis tardissimis, staminibus stigmate tripartito ramoso brevioribus.

Crocus autumnalis sativo similis, florum capillamentis tenuissimis minus odorus. *Tournef. Cor. p.* 25.

Copiosissimus in collibus, agris, pascuis. Floret Septembri. ♃.

OBS. Quatuor mihi innotuerunt Croci species, quas omnes in Tauria sponte crescentes observavi; duas præcoces, duas autem serotinas: priores sunt; *Crocus vernus* et *luteus*, posteriores *Crocus autumnalis* et *speciosus*. Omnium caracteres et descriptiones Floræ Tauricæ, quam jam elaboratam prælo proxime committere propositum habeo, inseram.

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* Vix ac ne vix quidem diversus a Croco nudifloro *Fl. Brit.*—ED.

5. Poa *pungens*. Nov.

P. spicis compositis distichis, spiculis ovatis subtrifloris, culmo repente.

In glareosis subsalsis planitiei ad Cyrum inter oppida Schamachiam et Sallianum juxta viam passim integras plagas occupat; magnum in peregrinatorum solatium jumentis unico propemodum in aridissimo tractu pabulo inserviens. Floret Maio, Junio. ♃.

Obs. Descriptionem hujus speciei, in Chersonesi Tauricæ maritimis antea observatæ, Flora nostra Taurica exhibebit. Spiculæ mihi tam in Tauria, quam in Caspicis ditionibus constanter trifloræ vel quadrifloræ visæ, Poam esse nec Agrostidem probant: reliquæ vero notæ omnes summam affinitatem cum Agrostide pungente Schreberi et Lamarckii probant.

6. Hordeum *secalinum*. Lamarck.

H. flosculis omnibus aristatis glabris, lateralibus masculis, foliis vaginisque glabris, radice repente.

H. *secalinum:* flosculis lateralibus masculis aristatis, involucris setaceis, aristis brevibus. *Lamarck Tabl. Enc. n.* 1155. *Flore Franc.* 3. *p.* 623.

Gramen spicatum secalinum minus. *Vaill. Paris. p.* 83. *tab.* 17. *fig.* 6; (sed folia justo breviora.)

Hordeum flosculis lateralibus masculis aristatis, calycum valvis setaceis. Var. β. spica amœne purpurea. *Gmel. Sib.* 1. *p.* 125.

Lectum in graminosis montanis fertilioribus, imprimis circa Kurt-Bulak. Floret Junio, Julio. ♃.

Obs. Solum e recentioribus Cl. Lamarckii synonymon procul dubio ad meam plantam spectat. Hordeum secalinum. *Schreb. Spic. Fl. Lips. p.* 148. discrepat foliis mollibus pilosis; porro H. secalinum *Roth Fl. Germ. ii.* 1. *p.* 150. radice annua, foliis mollibus pilosis, spicis brevioribus, flosculis lateralibus filiformibus staminibus pistilloque destitutis. Propius ad nostrum accedit ejusdem Hordeum maritimum loc. cit.; differt tamen vaginis inferioribus hirsutis, flosculis lateralibus dorso villosissimis*.

7. HORDEUM *maritimum*. Linn.

H. flosculis omnibus aristatis glabris, lateralibus sterilibus, foliis vaginisque inferioribus molliter villosis, radice fibrosa annua.

H. geniculatum culmo decumbente foliis obtecto, summo spathaceo spicæ subjecto supremo nodo incurvato. *Allion. Pedem.* II. *p.* 259. *n.* 2274. *tab.* 91. *fig.* 3.

In arenosis ad mare Caspicum, nec non ad rivulorum viarumque margines lapidosos non infrequens. Floret cum præcedente. ☉.

OBS. Graminis etiam in Tauriæ maritimis sterilibusque copiosi descriptionem Floræ Tauricæ reservavi. Ab affinibus Hordeo secalino et murino facile dignoscitur: altitudine vix spithamali, culmo ad genicula fracto (unde nomen triviale Allionii), colore glauco, pube foliorum vaginarumque inferiorum mollissima. Synonymon Allionii certe huc pertinet, quamvis folium summum spathaceum dici nequeat: culmus tantum solito tardius elongatur, adeoque spicam, post egressum, ab ultimo folio tardius removet. Cæterum icon Allionii rudis admodum, vix nisi habitum plantæ exprimit.

8. SCABIOSA *Columbaria*.

S. corollulis quinquefidis radiantibus, foliis radicalibus primigenis simplicibus crenatis basi auriculatis, caulinis compositis, summis linearibus, seminum coronula angustissima, setis disci longissimis.

Radix biennis, brevis, apice fibrosa, extus nigricans.

Caulis erectus, firmus, basi simplex, sæpe bipedalis, teretiusculus, inferne purpurascens, ad genicula albo-villosus, cæterum fere glaber; superne divisus in ramos elongatos floriferos, more congenerum.

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* Conf. Rothii Obss. in hanc et sequentem speciem. *Ann. of Bot. vol. i. p.* 308.—ED.

Folia radicalia primigena oblonga, in petiolum longum decurrentia, indivisa, basi tamen quasi lyrata ob petiolum passim dentibus ceu rudimentis pinnularum instructum, inæqualiter, grosse et obtuse serrata, utrinque valde villosa. *Folia radicalia secundaria* sæpe incisa, petiolorum appendiculis crebrioribus et majoribus, ita quidem ut jam composita videantur lobo terminali maximo. Eadem omnino ratione, dum dentes petiolares augentur numero et magnitudine, folium vero decrescit et profundius secatur, caulina fiunt vere pinnata, pinnis inciso-serratis, adscendendo angustioribus, magis elongatis et minus dentatis: summa autem denuo evadunt simpliciora et ramea nonnulla communiter lineari-subulata et simplicia extant. Villositas quoque adscendendo sensimque minuitur, at nunquam penitus evanescit et ad exortum foliorum imprimis adparet.

Pedunculi elongati, subtilissime striati, flores versus pubescentes, præsertim sub ipso calyce.

Calyx communis constat foliolis usque ad 12 lanceolatis, acutis, integris, capitulo brevioribusque, post florescentiam reflexis.

Flosculi quinquefidi radiantes; tubo longo pubescente, laciniis obtusis, extima majore, duabus interioribus minoribus, omnibus constanter saturate cæruleis.

Stamina corollulas, styli stamina superant.

Receptaculum paleaceum, paleis subulatis, membranaceis, brevibus vix longitudine germinum.

Semina membrana angustissima, alta, lacera coronata, et in medio setis quinque atropurpureis instructa; quæ setæ florente planta corollulas æquant, postea magis adhuc elongantur.

Communis in graminosis sylvaticis per totum hunc tractum. Floret Junio, Julio. ♂.

Obs. Autores quamvis multa de Scabiosa ochroleuca et columbaria disseruerint, immo icones adjecerint, differentiam tamen sufficientem vix ullam hucusque exhibuisse mihi videntur. Foliorum polymorphia et radicalium caducitas, compluribus, præferente facem ipso magistro, ansam præbuit, Scabiosis, quæ hic in computum veniunt, ochroleucis folia radicalia pinnato-composita, cæruleis autem eadem indivisa tribuendi. Recentiores vero, animadvertentes ambas hasce notas, scilicet cum foliis radicalibus compositis flores ochroleucos, et cum foliis radicalibus simplicibus flores cæruleos nequaquam semper conjunctos esse, iverunt in partes, alii e. g. Cl. Jacquin florum colorem, alii e. g. Cl. Roth foliorum formam urgentes. Mihi quidem neutrum constituendæ differentiæ specificæ aptum et sufficiens esse videtur; qualis fortasse differentia ex curatiore floris et imprimis seminum observatione et comparatione obtineri poterit. In Taurica Chersoneso cum floribus constanter ochroleucis semina coronula latiore setisque brevioribus helvolis, et in Caucaso Caspico cum floribus semper cæruleis semina coronula angustissima setisque prælongis atro-purpureis observavi; inter utriusque autem folia tam radicalia quam caulina nullam prorsus differentiam animadverti. An idem etiam alibi, imprimis in Europa occidentali obtinet?

9. ALCHEMILLA *pubescens*. Lamarck.

A. foliis lobatis, lobis cuneiformibus antice crenatis, subtus sericeo-villosis.

A. *pubescens* foliis lobatis subtus pubescentibus, caule villoso, floribus pedicellatis. *Lamarck Tabl. Enc. Bot. n.* 1703.

Alchemilla alpina β. hybrida. *Linn. ed. Reich.* 1. *p.* 349.

Alchymilla minor hirsuta cineritia Italica. *Barrel. Ic.* 728. *bona.*

Lecta in montibus altioribus siccis circa Kurt-Bulak. Floret Junio. ♃.

Obs. Præter pubem sericeam, imprimis foliorum paginæ inferioris et calycum, ab Alchemilla vulgari differt statura humiliore et foliis profundius lobatis, angulo incisionis acutissimo, adeo ut lobi sæpius imbricati appareant; qui cæterum obtusissimi sunt, margine laterali integerrimo et antice crenis paucioribus obtusioribusque quam in A. vulgari*.

10. **Onosma** *echioides.*

O. caule superne ramoso, foliis lanceolato-linearibus hispidis utrinque viridibus, fructibus erectis, corollis calyce duplo longioribus.

Onosma echioides. *Jacq. Austr.* 3. *p.* 52. *tab.* 295.—*Borkhausen apud Römer Nov. Repert. Bot.* 1. *p.* 1.

Reliqua synonyma autorum inter hanc et insequentem speciem dispertienda.

β. Onosma altissima: alta, ramosissima, foliis latioribus.

Onosma orientalis. *Pallas Itin.* 2. *p.* 734. *tab.* L?

Congenerum maxima, cujus var. β. interdum ad quadripedalem altitudinem excrescit, facie Symphyti.

Radix perennis, longa, simplex, cortice rubro.

Caulis communiter sesquipedalis aut bipedalis, superne ramosissimus, pilis sive setulis pellucidis, erectis, creberrimis, e puncto calloso oriundis; quam maxime hispidus, sicut tota planta.

Folia lanceolato-linearia, aut in var. β. lanceolata, setulis pellucidis rectis hispida, attamen utrinque viridia; inferiora basin versus attenuata, superiora sessilia basi subcordata.

Racemi versus ramorum apices foliosi, secundi, juniores convoluti, ætate evolvendi.

Bracteæ foliis similes, nisi quod breviores et minores.

Flores magnitudine Symphyti.

Calyx ad basin usque fissus, foliolis linearibus, valde hispidis.

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* In *Spec. Pl. Willd.* pro varietate Alchemillæ vulgaris habetur. An A. minor *Huds. Fl. ed.* 1. huc pertinet?—Ed.

Corolla generis, calyce duplo longior, ochroleuca.

Antheræ basi connexæ mediantibus hamulis baseos lateralis, fere corollæ longitudine.

Stylus simplex, corolla longior.

Semina lævia, intra calyces persistentes et erectos.

Non infrequens in pascuis et collibus apricis. Var. β. altissima occurrit in arenosis maris Caspici ad oras rivuli Buam. Floret Junio. ♃.

Obs. Onosmæ species Rossicas, quæ mihi hactenus innotuerunt, subnecto, quarum eas, quæ Caucaso Caspico peregrinæ sunt asterisco notavi.

* Onosma *tinctoria*. Nova.

O. caule superne ramoso, foliis lanceolato-linearibus hispidis utrinque viridibus, fructibus erectis, corollis calycem superantibus.

Præcedenti nimium affinis differt statura plerumque humiliore et habitu simpliciore.

Radix cortice colore sanguineo inquinante.

Folia præcedente nonnihil angustiora.

Flores minores, corollis duplam calycis longitudinem non attingentibus, pallidis, defloratis citrinis; fauce paullo magis angustata quam in antecedente.

Occurrit in Tauriæ pascuis circa Kertsch et Jenikale, nec non in Ucrania et in planitiebus Tanaicensibus. Floret cum præcedente. ♃.

Obs. Forsitan ad hanc spectat: Cerinthe echioides. *Scop. Carn. ed.* 2. *n.* 197. Contra ad præcedentem potius refero, Onosmam foliis lanceolatis hispidis, fructibusque pendulis. *Gmel. Sib.* 4. *p.* 76. *tab.* 40; nec non Anchusam luteam majorem C. B. *Moris. Hist.* 3. *p.* 442. *sect.* 11. *tab.* 27. *fig.* 1. Præcipuam a præcedente differentiam suppeditat florum magnitudo et proportio ad calycem; de qua differentia nihil in autoribus reperio.

* **Onosma** *simplicissima.*

O. caule subsimplici, foliis lineari-lanceolatis hispidis subtus albido-pilosis, fructibus erectis.

O. *simplicissima* foliis confertis lanceolato-linearibus pilosis. *Linn. ed. Reich.* 1. *p.* 396.

O. *sibirica* caulibus simplicibus, foliis lanceolato-linearibus piloso-hispidis, racemo cernuo. *Lamarck Tabl. Enc. Bot. n.* 1836.

Radix perennis, cortice exteriore nigricante.

Caules nonnulli, basi aliquantum declinati, statim adscendentes, vix dodrantales, pilis rigidulis albidis parum extantibus et multo exilioribus ac mitioribus quam antecedentium obsiti.

Folia lineari-lanceolata, admodum angusta, supra viridia, pilis caulinis similibus e puncto minimo calloso originem ducentibus adspersa, subtus vix nisi nervo dorsali pilis hirto, reliqua autem superficie pube tenui incumbente albida et splendente vestita.

Racemi pauci ad apicem caulis, forma præcedentium, bracteis pedunculis calycibusque magis hirtis quam caulis et folia.

Corolla forma, colore et fere magnitudine Onosmæ echioidis.

Habitat in Sibiria, regione Tanaicensi, Ucrania. Floret Maio, Junio. ♃.

Obs. Subsequenti affinis cum præcedentibus confundi nequit, statura et pube diversissima.

11. **Onosma** *Taurica.*

O. caulibus simplicibus e basi multicipe, foliis lineari-lanceolatis hispidis utrinque albo-pilosis, fructibus erectis.

Onosma Taurica. *Pallas Tableau de la Tauride, p.* 47.

Differt ab antecedente caulium basi multicipe sublignescente; foliis radicalibus numerosioribus magisque congestis, omnibus utrinque pilis albis crebrioribus et majoribus vestitis;

tis; racemo plerumque tantum unico terminali: corollis paulo majoribus, saturate luteis.

Frequens in Tauriæ collibus apricis circa Karassubasac et Sympheropolin, passim quoque in montosis Caucasi Caspici occurrit. Floret Maio, Junio. ♃. ♄.

12. Echium *asperrimum*. Lamarck.

E. strigosissimum ramosum, spicis lateralibus conjugatis.

E. *asperrimum* caule ramoso pilosissimo, corollis calyce longioribus, staminibus exsertis. *Lamarck Tabl. Enc. Bot. n.* 1854.

Echium foliis hirtis lingulatis, calycibus pungentibus, spicis laxis paniculatis. *Hall. Helv. n.* 604.

Echium flore albo. *Camerar. Epit.* 738.

Echium orientale majus et asperius flore leucophæo. *Tournef. Cor. p.* 6.

Commune in incultis ad vias, pagis; antea in Tauria quoque copiose visum. Floret Junio, Julio. ♃.

Obs. Icon Camerarii totum plantæ nostræ habitum exprimit: imprimis racemos conjugatos qui caracterem speciei optimum et constantissimum suppeditant, bene exprimit; male igitur Linnæus Camerarii plantam ad suum Echium italicum retulit, quod a nostro differre præter alia hoc satis probat, quod Echium suum italicum mitius et lævius esse Echio vulgari Linnæus asserat. (*vid. Hort. Ups. p.* 35.) Echium altissimum *Jacq. Fl. Austr.* nostro maxime affine est, et fortasse unum idemque*.

13. Lysimachia *orientalis*. Lamarck.

L. racemis terminalibus, petalis obtusis erectis, foliis petiolatis, imis obovatis, superioribus lanceolatis.

L. *orientalis* racemis terminalibus, staminibus corolla brevioribus, foliis lanceolatis subpetiolatis. *Lamarck Tabl. Enc. Bot. n.* 1972. *Dict. E. B. iii. p.* 570.

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* Ita est; Echium vero altissimum *Jacq. Austr.* non differt ab E. italico.—Ed.

Lysimachia spicata purpurea minor. *Buxb. Cent.* 1. *p.* 22. *tab.* 33. *pygmæa.*

Radix perennis, fibrosa, brevis, dilute purpurascens.

Caulis erectus, simplex, pedalis, angulatus, inferne purpurascens, lævis.

Folia flaccida, glabra, glaucescentia; ima obovata, in petiolum attenuata, superiora lanceolata, acutiora, brevius petiolata, margine undulata.

Racemus terminalis, interdum quoque nonnulli laterales, simplicissimi, elongati, compacti, forma Veronicæ spicatæ.

Pedicelli florentis plantæ brevissimi, seminiferi elongati semunciales.

Bracteæ subulatæ, minutæ, forma foliolorum calycinorum.

Flores vix Veronicæ spicatæ floribus majores.

Calyx 5-partitus, segmentis lineari-lanceolatis e viridi in spadiceum vergentibus.

Corolla monopetala, rosea, calyce longior; tubo brevissimo; limbo profunde 5-fido, laciniis erectis, conniventibus, obtusis.

Filamenta alba. *Antheræ* flavæ corollam supereminentes.

Stylus in florente staminibus brevior, in fructu persistit et elongatur.

Stigma simplex, minimum.

Capsula exacte sphærica, magnitudine Pisi, purpurascens, lævis, pedicellata, stylo setaceo coronata.

Crescit hinc inde in planitie Kubensi, circa torrentem Samur, ad vias et nemorum margines. Floret Maio, Junio. ♃.*

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* Est Lysimachia dubia *Hort. Kew.*—Ed.

14. **Campanula** *Caucasica.* Nova.

C. (capsulis obtectis, calycis sinubus reflexis) capsulis trilocularibus cernuis, cauliculis erectis paucifloris, foliis obovatis crenatis scabris, radice repente.

Planta perennis, pygmæa.

Radix tenuis, albida, transversaliter sub terra prorepens et per intervalla folia cauliculosque promens.

Caules erectiusculi, simplices, tenelli, plerumque digito minores, interdum vix sesquiunciam longi, pubescenti-scabri, sicut tota plantula.

Folia radicalia obovata, in petiolum attenuata, crenata, hirta, Violæ tricoloris foliis analoga; caulina alterna, minora, angustiora et acutiora.

Flos terminalis, sæpe solitarius; tum quoque aliqui laterales, pedicellati, primum erecti, mox nutantes, non magni.

Calyx 1-fidus, segmentis subæqualibus, acutis, margine ciliatis, alternis reflexis germen obtegentibus.

Corolla cærulea, tubo cylindrico calyce duplo longiore, limbo angusto, laciniis triangularibus.

Squamulæ antheriferæ dilatatæ, breves loco filamentorum, ut solent in hoc genere.

Antheræ oblongæ.

Stylus columnaris, corolla brevior. *Stigma* trilobum.

Capsula cernua, trilocularis. *Semina* subrotunda, nitida, rufescentia.

In abruptis sterilissimis lapidosis circa Kurt-Bulak lecta. Floret Junio, Julio. ♃.

Obs. Videtur Campanulæ saxatili proxima, nec a Camp. dichotoma aliena; suæ tamen speciei. Dignoscenda radice late repente, cauliculos exiguos simplicissimos promente; pube exili; floribus parvis; capsulis trilocularibus, cernuis. In floribus quinta pars numeri sæpe deficit; calyce scilicet 8-fido, cor. 4-fida, staminibus quatuor.

15. Salsola *Kali.*

S. herbacea patula hirta, foliis subulatis apice spinosis; calycibus solitariis bracteatis, fructiferis explanatis coloratis.

S. *Kali* herbacea decumbens, foliis subulatis spinosis, calycibus marginatis axillaribus. *Linn. ed. Reich. i. p.* 624.

Salsola Kali autorum. *Pallas Itin.* 1. *p.* 489. *n.* 105.

Communis in salsis et subsalsis. Floret Julio, Augusto. ⊙.†

* Salsola *Tragus.*

S. herbacea glabra, ramis erectiusculis, foliis subulatis apice spinosis, calycibus solitariis bracteatis, fructiferis explanatis hyalinis.

In maritimis Tauriæ circa Kertsch et Jenikale lecta. Floret cum præcedente. ⊙.

Obs. Utraque species S. Kali et Tragus occurrit in Tauria, ubi sollicite observandi et comparandi mihi occasio fuit. Affinitas quidem utriusque summa, neque vero tanta, ut ad unam eandemque speciem referri queant. Duæ quondam ab antiquioribus Botanicis species huc pertinentes descriptæ fuerunt; altera foliis longioribus, altera vero magis communis foliis brevioribus et crassioribus. Hanc Ill. Linnæus ad S. Kali, illam ad S. Tragum retulit. Equidem, quantum colligere licet ex descriptionibus imperfectis et rudibus iconibus, contrarium opinor; scilicet illam proprie ad S. Kali Linn. et hanc ad ejusdem S. Tragum pertinere. Quod in S. Kali stylus sit trifidus, et in Trago bifidus, nunquam observavi; verum in utraque constanter vidi bifidum. Uberiorem utriusque descriptionem Flora nostra Taurica exhibebit.

Salsolæ Sodæ in Tauria antehac observatæ definitionem emendatam subnecto:

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† De hac specie, quam cum sequente conjunxit Pallas, videsis Cel. hujus viri *Illustrat. Plantar. p.* 26. ubi et figuræ eximiæ.—Ed.

* SALSOLA *Soda*.

S. herbacea glabra, ramis adscendentibus, foliis elongatis semiteretibus, calycibus subbinatis bracteatis, fructiferorum foliolis dorso transversaliter carinatis.

In maritimis subhumidis Tauriæ circa Kertsch et Jenikale lecta. Floret Augusto. ⊙.

16. SALSOLA *rosacea*.

S. herbacea patula, foliis linearibus teretibus inermibus, calycibus subsolitariis bracteatis, fructiferis explanatis coloratis.

S. *rosacea* herbacea, foliis subulatis mucronatis calycibus explanatis. *Linn. ed. Reich. i. p.* 624?

Kali humile alis purpureis florem rosaceum mentientibus. *Buxb. Cent.* 1. *p.* 9. *tab.* 14. *fig.* 2.

Salsola foliis ternis, floribus substratis, ex conico subulatis, flores æquantibus. *Gmel. Sib.* 3. *p.* 96. *n.* 75.

Radix annua, simplex, albida.

Caulis erectus, mox spithamæus, mox pedalis et ultra; ramis inde a basi alternis, patentibus, validis.

Folia linearia, breviora et crassiora quam in S. Kali, basi præsertim floralia latiora, omnia inermia glabra.

Flores axillares situ et forma S. Kali.

Calyces quoque fructiferi excrescentes in membranam latam coloratam spadiceam aut fuscam.

Semen ut in S. Kali et Trago.

Frequens ubique in squalidis salsugineis imprimis planitiei ad Cyrum fluvium. Floret Augusto, Septembri. Semina vero autumno perficit. ⊙.

OBS. Folia, ne acuminata quidem, in Systemate Linnæano nullo jure dicuntur mucronata; quod fortasse Cl. Pallas in *Itin. vol. i. p.* 489. ansam præbuit quærendi: anne varietas S. Kali pumila, quam describit, sit Salsola rosacea Linn.?

17. SALSOLA *glauca*. Nova.

S. fruticosa erecta glaberrima, foliis semiteretibus filiformibus,

formibus, calycibus solitariis bracteatis, fructiferis explanatis hyalinis*.

Kali orientale fruticosum altissimum, florum staminibus purpureis. *Tournef. Cor. p.* 18.

Kali fruticosum spicatum. *Buxb. Cent.* 1. *p.* 8. *tab.* 13?

Frutex ramosus inter sesquipedalem et quadripedalem altitudinem varians.

Caulis erectus, lævissimus, albidus; ramis elongatis adscendentibus, fragilibus.

Folia filiformia, semiteretia, inermia, glaberrima, cum nebula glauca sicut tota planta; inferiora sesquiuncialia, floralia breviora et sicut in S. Kali, Soda et aliis, basi complanata flosculosque amplectentia.

Inflorescentia florumque forma et magnitudo ut in antecedentibus; floribus scilicet versus ramorum ramulorumque extremitates alternis, axillaribus, solitariis, inter bracteas duas folio florali substantia et forma similes.

Calyx pentaphyllus, erectus; foliolis ovatis, acutis, concavis, dorso viridibus, margine albo-membranaceis.

Filamenta eleganter purpurea, calycem vix æquantia.

Antheræ oblongæ, acutæ, basi bifidæ, filamentis concolores.

Stylus bifidus, staminibus brevior. *Stigmata* simplicia.

Calyces fructiferi dorso in membranam explanatam, margine vix laceram albidam excrescunt.

Semen situ et forma S. Kali.

Lecta hinc inde in abruptis sterilissimis circa Kurt-Bulak. Floret Julio. ♄.

Obs. Synonymon Buxbaumii supra allegatum ad nostram potius pertinet, quam ad Salsolam frutescentem Pallasii, ad quam vir Cl. trahit *Itin.* 1. *p.* 488. Nota. Salsolam arborescentem Linn. ignoro, credo tamen a nostra S. glauca differre.

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* Salsola spicata *Pallas Illustr.* 1. *p.* 27. *t.* 19. a planta Tournefortii diversa videtur.—Ed.

18. Salsola *vermiculata.*

S. fruticosa ramosissima, foliis imis setaceis brevibus, floralibus minutissimis; calycibus solitariis bracteatis sparsis, fructiferis explanatis hyalinis‡.

S. *vermiculata:* frutescens, foliis ovatis acutis carnosis. *Linn. ed. Reich.* 1. *p.* 627.

S. *vermiculata* fruticosa, floribus spicatis alternis solitariis. *Loefling It. p.* 129.* *Pallas It.* 1. *p.* 488. *n.* 103.

Kali fruticosum Ericæ folio. *Buxb. Cent.* 1. *p.* 8. *tab.* 14. *fig.* 1.

Salsola foliis ternis floribus substratis, teretiusculis, ovatis, flore brevioribus. *Gmel. Sib.* 3. *p.* 98. *n.* 76.

Fruticulus pedalis aut sesquipedalis, dense ramosus, cortice cinereo fisso.

Folia ad imos ramos sparsa, setacea, brevia, inermia, caduca; floralia minutissima, concava, forma et substantia squamularum calycinarum, nisi quod minora paullo et acutiora.

Flosculi minuti, ad cujusvis folii axillam solitarii, sparsi, numerosissimi et ramos totos obtegentes, plerique abortientes.

Bracteæ duæ, minimæ, orbiculatæ, obtusissimæ, concavæ, virides, margine tenuissime membranaceo flosculum suum obvolventes.

Calyx clausus; foliolis oblongis, acutiusculis, membranaceis, albicantibus cum apiculo tenuissime purpurascente.

Glandulæ nectariferæ in fundo calycis, staminibus interjectæ.

Stamina quinque; filamentis brevibus; antheris oblongis, acutis, basi bifidis, flavis, calycem excedentibus.

Germen subrotundum; stylus rectus fere calycis longitudine; stigmata simplicia.

Calyces fructiferi dorso in membranam explanatam sublaceram hyalinam excrescentes.

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‡ An eadem cum S. rigida *Pall. Illustr.* 1. *p.* 20. *s.* 12?—Ed.

Semen spirale, in gyros nonnullos convolutum.

Frequens in salsugineis aridis, præsertim planitiei ad Cyrum et inde versus portum Baku usque ad saxum Beschbarmak: Gratissimum camelis pabulum. Floret Augusto; semina Novembri perficit. ♄.

Obs. Folia inferiora adeo sunt caduca, ut mihi, ineunte Julio planta primum visa, plane aphylla apparuerit. Postea in herbariis vidi specimina circa Astrachanum alibique ad Wolgam, iisdem in locis collecta, ubi e Persia septentrionali redux adultam plantam copiosissimam ipse videram; quæ specimina ad imos ramos manifeste foliosa extabant. Hæc foliorum genuinorum raritas et caducitas, jam Buxbaumio causa fuit dicendi flosculos creberrimos foliorum conspectum eripere. Flores juniores cum ramulis sæpe pube levi cinerascunt, quæ in adultioribus evanescit.

Vidi quoque in herbario Celeb. et Amiciss. Stephani, Professoris Mosquensis, cujus de re herbaria Ruthena merita alibi commendavi, specimina circa Saratow lecta, quæ quantum e siccis colligere licebat, a nostris radice annua et statura pygmæa, nec ulla prorsus alia nota differebant. Kali bacciferum granulosum *Gmel. Sib. vol.* 3. *pag.* 99. *n.* 77. *var. ii. tab.* 21. *fig.* 2. nihil aliud erit quam Salsola vermiculata nostra, qualis emarcida et morbosa sæpe conspicitur inter Astrachanum et Kislar, unde Gmelinus sua specimina acceperat.

19. Salsola *hyssopifolia.*

S. herbacea patula, foliis linearibus planis subpubescentibus, calycibus glomeratis ebracteatis, fructiferorum foliolis spina dorsali uncinata.—Salsola hyssopifolia. *Pall. It.* 1. *p.* 491. *n.* 107. *tab.* H. *fig.* 1.

Planta annua, Sals. muricatæ affinis.

Radix tenuis, fibrosa, albida.

Caulis erectus, circiter pedalis, purpurascens sicut Sals.

prostratæ, inde a basi ramosissimus; ramis patulis, elongatis, attamen minus quam in Sals. muricata.

Folia forma Sals. muricatæ, sed paullo breviora minusque pubescentia, margine non ciliata. Lana vaga ad foliorum floralium axillas.

Flosculi axillares, plerumque plus duobus, glomerati, magnitudine et forma Sals. muricatæ.

Styli 2 filiformes, longi, purpurei.

Calycum fructiferorum foliola fornicata germinique superne incumbentia, dorso exserunt spinulam innocuam, albidam, uncinatam.

Semina corticata, forma Sals. muricatæ.

Occurrit in subsalsis ad arundineta fluvii Cyri. Legi Novembri florentem. ⊙.

Obs. A Salsola muricata facillime dignoscitur calycum fructiferorum spinula uncinata.

Salsolam hyssopifoliam a nostra certe diversam describit Nocca apud *Usteri Annal. Botan.* 6. *p.* 60.

20. Salsola *muricata*.

S. herbacea, erecta, pilosa, ramis filiformibus; foliis linearibus planis, calycibus binis ebracteatis, fructiferorum foliolis spina dorsali recta.

S. *muricata:* fruticosa patula, ramulis hirsutis, calycibus spinosis. *Linn. ed. Reich.* 1. *p.* 628.

S. sedoides. *Pallas It.* 1. *p.* 492. *App. n.* 108. *tab.* I. *fig.* 1. 2. *et iii. p.* 630. *tab.* M. *fig.* 3.

Chenopodium maritimum, ramulis virgatis. *Buxb. C.* 3. *p.* 27. *tab.* 49.

Occurrit rarius in sterilibus subsalsis. Floret autumno. ⊙.

Obs. Plantæ in Tauria frequentissimæ descriptionem Flora Taurica nostra continebit. Hic definitio speciei emendata sufficiet.

21. SALSOLA *prostrata.*

S. sublignescens, ramis adscendentibus, foliis linearibus planis pilosis, calycibus glomeratis ebracteatis, fructiferis explanatis coloratis.

Salsola prostrata frutescens, foliis linearibus pilosis inermibus. *Linn. ed. Reich. i. p.* 627. *Pall. It.* 1. *p.* 490. *n.* 106. *tab.* G. e.

Salsola prostrata. *Loefl. It. p.* 131.* optima descriptio.

Kali foliis Linariæ tomentosum. *Buxb. Cent.* 1. *p.* 10. *tab.* 16. pessima icon §.

Communis in collibus apricis inter Kubam et Schamachiam, solo vix salso. Floret Julio, Augusto. ♄. ♃.

OBS. Gallis sæpe inficitur, unde Buxbaum. cit. asserit: dari plantas quæ florum loco gerant globulos axillares lanuginosos, inter quos tubuli corniculati; cui descriptioni gallarum forma exacte respondet.

22. SALSOLA *fruticosa.*

S. fruticosa ramosissima glabra, foliis oblongis obtusis carnosis, calycibus ternis ebracteatis petiolaribus, fructiferorum foliolis convexis dorso æqualibus.

S. fruticosa: erecta, fruticosa, foliis filiformibus obtusiusculis. *Linn. ed. Reich.* 1. *p.* 627.

Frequens cum S. vermiculata occurrit, quam statura et ramificatione æmulatur; cæterum Salsolæ altissimæ, imprimis quoad inflorescentiam, affinis. Floret cum Sals. vermiculata. ♄.

OBS. Salsola baccifera ramosissima. *Gmel. Sib.* 3. *p.* 99. *n.* 77. *var.* I. *tab.* 21. *fig.* 2. videtur esse Salsola fruticosa, qualis adparet autumnum versus aut vernali tempore festine vegetans, aut reviviscens. Saltem Gmelini specimina ex eo ipso tracta allata sunt, ubi equidem Salsolam fruticosam copiosissimam vidi e Persia septentrionali redux, Februario anni 1797.

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§ Kali fruticosum incanum foliis exsuccis *Buxb. Cent.* 1. *t.* 15. huc pertinet secundum *Pall. Illustrat.* 1. *p.* 17.—ED.

23. SALSOLA *altissima.*

S. herbacea glabra, ramis erectis, foliis filiformibus carnosis, calycibus ternis ebracteatis petiolaribus, fructiferorum foliolis convexis dorso æqualibus.

S. *altissima:* herbacea erecta ramosissima, foliis filiformibus acutiusculis basi pedunculiferis. *Linn. ed. Reich.* 1. *p.* 625.

Passim in ruderatis, ad fossas et vias obvia. Floret cum præcedente. ⊙.

OBS. Plantæ satis cognitæ definitionem tantum hic inserendam putavi.

24. SALSOLA *maritima.*

S. herbacea patula glabra, foliis linearibus obtusiusculis carnosis, calycibus glomeratis ebracteatis axillaribus, fructiferorum foliolis convexis dorso æqualibus.

Chenopodium maritimum, foliis subulatis semicylindricis. *Linn. ed. Reich.* 1. *p.* 612.

Occurrit in glareosis inundatis salsugineis. Floret Julio. ⊙.

OBS. Stirpem hanc a Sals. altissima genere nullo jure separari, alii jam monstraverunt. Chenopodium, Salsola, Anabasis, nec non Polycnemum, saltem quoad species nuper autoritate Cl. Pallasii ad hoc genus relatas, genera sunt adeo affinia, ut limites naturales difficillime constituantur. Salsolæ bracteis propriis carentes, imprimis eæ, quarum calyx fructifer dorso in membranam haud excrescit, ob semen corticatum lenticulare, Chenopodio propiores sunt. Polycnema Pallasii meliori jure ad Anabasin referuntur, quam ad Polycnemum Linn. flore et fructu ab illis alienum. In speciebus hactenus a systematicis ad Anabasin relatis foliola calycina variant et numero et forma; essentia vero generis potissimum quærenda est in semine solitario cochleato, intra membranam liquore quodam oleoso turgidam verticaliter posito; quæ nota etiam in polycnemis Pallasii observatur.

Quibus perpensis sequentes caracteres genericos naturæ consentaneos esse arbitror:

a. CHENOPODIUM: *Cal.* 5-phyllus, fructiferi foliolis conniventibus dorso æqualibus. *Cor.* 0. *Semen* unicum corticatum.
Huc referendæ: *Salsola fruticosa, altissima, sativa.*

b. SALSOLA: *Cal.* 5-phyllus, fructiferi foliolis medio transversaliter carinatis appendiculatis. *Cor.* 0. *Semen* unicum tectum, situ horizontali (sæpe spirale).
(Salsolæ in duas phalanges discedunt, quarum altera complectitur Sodas: flosculis bracteatis, semine cochleato; altera Chenopodoideas: flosculis ebracteatis, semine corticato.)
Ad has pertinent: *Sals. prostrata, muricata, hyssopifolia* et aliæ; ad illas vero: *Sals. Kali, Tragus, rosacea, Soda, glauca, vermiculata.*

c. ANABASIS: *Cal.* 2—5-phyllus. *Cor.* 0. (nisi calycem dicas.) *Semen* unicum spirale, intra membranam liquore oleoso turgidam verticale.
Huc pertinent: *Polycnemum triandrum, oppositifolium, sclerospermum.* Pall. *Salsola Echinus.* La Billard.

d. POLYCNEMUM solo *Polyc. arvensi* Linn. absolvitur.

25. ANABASIS *aphylla.*

A. pentandra, ebracteata, calyce pentaphyllo minimo, foliolis tribus dorso appendiculatis, caule articulato aphyllo.

A. *aphylla,* articulis emarginatis. *Linn. ed. Reich.* 1. *p.* 628.

Salsola baccifera Salicorniæ facie. *Gmel. Sib.* 3. *p.* 101. *n.* 78.

Kali bacciferum Salicorniæ facie. *Buxb. C.* 1. *p.* 11. *tab.* 18.

Pallas It. 1. *p.* 493. *App. n.* 109. β.*

Occurrit haud raro in districtu salso ad Cyrum usque ad oppidum Baku. Floret Julio, Augusto. Novembri semina fert. ♄.

Obs. Frutex sicut foliis, ita bracteis quoque destituitur. Autores huic speciei tribuunt calycem triphyllum et corollam pentapetalam; sed me quidem judice nullo omnino jure. Quod illis calyx vocatur, nihil aliud est, quam membrana ex veri folioli calycini dorso originem trahens, ætate aucta et dilatata; sicut accidit in plerisque Salsolis, quibus nemo hucusque calycem duplicem vel corollam adscribere voluit. Quod in Anabasi aphylla, e foliolis calycinis duo tali membrana destituantur; et quod ipsa membrana in reliquis foliolis erectior sit, atque respectu folioli sui major; id sane haud sufficit, ad constituendum caracterem, congeneribus et Salsolæ speciebus affinibus plane alienum. Florem optime descripsit Cl. Pallas loco supra citato.

26. Anabasis *Echinus*†.

A. pentandra, calyce pentaphyllo, foliolis omnibus dorso appendiculatis, foliis subulatis, ramis spinescentibus.

S. *Echinus:* fruticosa glabra, foliis subulatis muticis, spinis divaricatis. *Labillardière Syr. dec.* 3.

Anabasis spinosissima *Linn.* secundum *Vahl. Symb.*

Suffrutex humilis, spinosus.

Radix perennis, lignosa, valida.

Caules basi lignescentes, divaricati.

Rami adscendentes, herbacei, circiter pedales, virgati, striato-angulati, juniores pubescenti-scabri, ætate glabri et glaucescentes sicut tota planta. Ramuli rigidi, apice spinescentes,

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* Anabasis tatarica *Pall. Illustr.* 1. *p.* 18. *t.* 8.—Ed.

† Sub nomine Salsolæ spinificis postea descripta et picta in *Pall. Illustr.* 1. *p.* 23. *t.* 21.—Ed.

nescentes, ad angulum rectum patentes, breves et adscendendo decrescentes.

Folia ima filiformia, semiteretia, mucrone minimo inermi terminata, foliorum secundariorum breviorum fasciculo axillari.

Folia ramea breviora, basique latiora; floralia bracteis similia iisdemque paullo longiora.

Flores utrinque ad exortum ramulorum oppositi, in ipsis autem ramulis alterni, axillares, forma florum Polycnemi triandri Pall.

Bracteæ duæ ovato-lanceolatæ, acutæ, carinatæ, margine albo-membranaceæ, calycem includentes.

Calyx pentaphyllus, bracteis paullo brevior; foliolis ovatis, concavis, albo-membranaceis, genitalia obvolventibus.

Stamina quinque, vix calyce longiora.

Filamenta apicem versus purpurascentia.

Antheræ purpureæ, oblongæ, basi bifidæ, filamentis infra apicem affixæ, polline flavo.

Germen subrotundum.

Styli duo, recti, conniventes. *Stigmata* simplicia.

Calycis fructiferi foliola excrescunt in membranam explanatam, margine apicis vix laceram, e viridi dilute purpurascentem, in duobus foliolis intermediis paullo angustiorem more Salsolæ.

Semen unicum cochleatum, intra membranam liquore oleoso turgidam verticale.

In collibus aridissimis, abruptis, subsalsis passim obvia. Lecta copiosius circa Kurt-Bulak; in collibus quoque a Cyro fluvio non dissitis hinc inde visa. Floret Julio. Semina Octobri perficit. ♄.

Obs. Icon la Billardierii loc. cit. nostram plantam bene exhibet; verum descriptio peccat eo, quod ramos apice spinescentes spinas nuncupat.

27. Anabasis

27. ANABASIS *triandra.*

A. triandra, calyce triphyllo, foliolis dorso æqualibus, foliis lineari-subulatis recurvis.

Polycnemum triandrum. *Pallas Itin.* 1. *p.* 483. *App. n.* 95. *tab.* D. *fig.* 2. *et tab.* E. *fig.* 1.

In glareosis salsugineis. Floret Julio, Augusto. ⊙.

OBS. Hanc in Tauria quoque obviam, cum stirpibus Tauricis ulterius describam. Male eam cum Polycnemo arvensi, toto cœlo diverso, conjungit *Lamarck Tabl. Enc. Bot. n.* 439.

28. ANABASIS *oppositifolia*†.

A. pentandra, calyce diphyllo, foliolis dorso æqualibus, foliis linearibus carnosis obtusis.

Polycnemum oppositifolium: caulibus erectis, foliis semicylindricis tomentoso-glaucis, inferioribus oppositis, floribus pentandris. *Lamarck Tabl. Enc. Bot. n.* 441.

Polycnemum oppositifolium. *Pallas It.* 1. *p.* 484. *tab.* E. *fig.* 2.

Chenopodium maritimum Sedi foliis teretibus. *Buxb. C.* 1. *p.* 21. *tab.* 31. *fig.* 1.

Occurrit cum præcedente, at solum magis salsum amat. Floret Julio. ⊙.

OBS. Planta in Flora nostra Taurica amplius describenda.

29. ERYNGIUM *cæruleum.* Nov.

E. foliis radicalibus cordato-ovatis, caulinis palmatis; involucri foliolis quinis subulatis basi utrinque spinula minima armatis, paleis mucronatis.

Eryngium cæruleum stellatum montis Libani. *Munting. Aardgew. cap.* 127. *p.* 455. *n.* 5.

Eryngium foliis radicalibus ovatis crenatis petiolatis, capitulis pedunculatis. *Gronov. Orient. n.* 76.

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† Polycnemum salsum *Willd. Sp. Pl.* 1. *p.* 192.—ED.

Eryngium Syriacum ramosum, capitulis minoribus cæruleis. *Moris. Hist.* 3. *sect.* 7. *p.* 166. *tab.* 37. *fig.* 13.

Radix perennis, simplex, foris nigra, intus albida.

Caulis dodrantalis, raro pedalis, tenuis, basi simplicissimus, superne in ramos paucos subdichotomos patulos divisus, teres, levissime striatus, colore pulchre amethystino pictus quo tota hæc planta elegans ab imo ad summum ornatur.

Folia radicalia petiolata, aut indivisa, aut obsolete lobata, cordato-ovata, crenata, obtusiuscula, caduca; caulina composita, subpalmata; segmentis lanceolatis dentatis, dentibus subulatis apice pungentibus et sæpe latere quoque spinula una alterave armatis.

Capitula pedunculata, parva, subglobosa, ad ramorum apices.

Involucrum pentaphyllum, capitulis quadruplo longius; foliolis subulatis, apice et utrinque supra basin spinula munitis, cæterum integerrimis.

Paleæ subulatæ, mucronatæ, integræ.

Abundat in collibus apricis siccis provinciæ Schirvaniensis, quibus colore suo amœnissimum sæpe aspectum conciliat. Floret Junio, Julio. ♃.

Obs. Affinis Eryngio tricuspidato Linn., at paleæ certe et constanter integræ. Elegans planta et præstanti colore insignis. Synonyma Gronovii et Morisonii Linnæus ad Eryng. tricuspidatum trahit; revera autem nostro magis congrua sunt, imprimis Morisonii Icon, quæ manifeste paleas integras et in simplicem mucronem desinentes, exhibet.

30. Bupleurum *exaltatum*. Nov.

B. involucro universali partialique subpentaphyllo minimo; foliis omnibus linearibus, inferioribus elongatis; caule erecto paniculato.

In pratis montanis et collibus siccioribus non infrequens. Floret Junio, Julio. ♃.

Obs. Stirps Tauriæ indigena, cum Tauricis describenda, a compluribus affinium statura altiore et radice perenni distinguenda, Bupl. rigido affinis: discrepat foliis etiam imis angustissimis ceu gramineis, involucris et involucellis exilioribus.

31. Cachrys *microcarpa*. Nov.†

C. foliis tripartito-decompositis, foliolis setaceis, seminibus glabris striis crenatis.

Cachrys semine fungoso sulcato aspero minore foliis Peucedani. *Moris. Hist.* 3. *p.* 267. *sect.* 9. *tab.* 1. *fig.* 1.

Cachrys foliis Peucedani, semine fungoso, sulcato, aspero, minori. *Tournef. Cor. p.* 23.

Planta umbellifera, perennis, speciosa.

Radix descendens, fibrosa.

Caules e radice sæpe nonnulli, sesquipedales aut bipedales, ramosi, striati, glabri et læte virides sicut tota planta.

Rami patentes, elongati, subdivisi.

Folia supradecomposita; petiolis trichotomis, ita ut trichotomiæ ramus medius semper debilior existat. *Petioli* primæ, secundæ et, in primordialibus foliis, etiam tertiæ divisionis, teretes sunt atque striati, substantia ramorum; ulteriores autem sunt substantia foliolorum.

Foliola ad petiolos ultimæ divisionis plerumque terna, interdum bina, rarius solitaria, subulata, circiter unciam longa, rigida, convoluta, mucrone apicis minimo.

Folia caulina pro more umbellatarum adscendendo evadunt simpliciora; floralia demum simpliciter ternata, immo suprema simplicia, forma foliolorum involucri, nisi quod latiora.

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† Cachrys taurica *Willd. Sp. Pl.* 1. *p.* 1410.—Ed.

Umbellæ ad caulis ramorumque apices, nec non aliquæ laterales, oppositæ, pedunculatæ; sæpe quoque pedunculi tres quatuorve umbellam sustinentes ex eodem puncto originem ducunt.

Pedunculi sulcati, rigidi.

Radii umbellæ à 3 ad 8, striati, flavicantes.

Involucrum universale 3—8-phyllum, pro numero radiorum umbellæ; foliolis subulatis brevissimis.

Radii umbellulæ circiter 8.

Involucrum partiale universali consimile, sed brevius.

Flosculi omnes fertiles.

Petala acutiuscula, involuta, lutea colore fœniculi.

Stamina concoloria patentissima.

Styli in florente minimi, in fructu reflexi.

Stigmata minima, subglobosa.

Fructus subglobosi, minime marginati, glabri, striis crenatis exarati.

Semina vix corticata, magnitudine circiter seminum Conii maculati, valde convexa, singula lineis elevatis crenatis quinque instructa; saporis aromatici acris, linguam instar piperis rodentia.

Crescit hinc inde ad margines lapidosos rivulorum in montanis sylvaticis inter Kubam et Schamachiam. Floret Julio. Semina Septembri perficit. ♃.

Obs. Planta facie Peucedani, fructu Conii attamen Cachrydi Siculæ proxima, quo cum Linnæo recentiores etiam synonymon Morisonii retulerunt. Differt manifeste seminibus minoribus glabris.

32. Heracleum *pyrenaicum* Lamarck.

H. foliis simplicibus lobatis pubescentibus subtus incanis, floribus uniformibus, seminibus margine ciliato-scabris.

Heracleum pyrenaicum: foliis simplicibus cordato-palmatis supra glabris, subtus tomentosis albis, seminibus orbicularibus. *Lamarck Dict. Enc. Bot.* I. *p.* 403.

Radix generis.

Caulis erectus, vix pedalis, crassus, sulcato-angulatus, leviter pubescens.

Folia fici foliis analoga, simplicia, subpalmata, cordato-ovata, lobata; inferiora petiolata, petiolo teretiusculo hirto, lobis supernis oblongis, medio trifido, lateralibus basi productis, margine omni denticulis minutissimis argutis.

Folia caulina sensim minora, suprema lobis integris, brevius petiolata, petiolis in vaginam amplam membranaceam striatam desinentibus. Cæterum folia omnia utrinque molliter pubescunt, subtus autem tomento tenuissimo albicant.

Umbellæ ad caulis ramorumque apices formæ solitæ in hoc genere, pedunculis et radiis sulcatis hirtis.

Flosculi albi, uniformes.

Semina formæ communis, scabra, disco lineis tribus elevatis viridibus et quatuor sulcis spadiceis notato, margine subtilissime ciliato.

Odor totius plantæ fortis, non ingratus, ad odorem Rutæ accedens.

Lectum passim in lapidosis ad rivulos sylvaticos, et in abruptis altioribus inter Kubam et Schamachiam, imprimis circa Kurt-Bulak. Floret Maio; Junio semina perficit. ♂.

Obs. De synonymo Cl. Lamarckii nullus dubito, quamvis folia supra glabra dicantur. Cæterum ad Heracleum alpinum proxime accedit, tamen statura, pube et denticulis marginalibus crebris minutisque nec non aliis notis satis distinctum.

33. Seseli *cuneifolium*. Nov.

S. foliolis cuneiformibus furcatis superioribus oblongis integris, seminibus villosis.

An Crithmum sive Fœniculum majus, odore Apii. *Moris. Hist.* 3. *sect.* 9. *p.* 290. *tab.* 7. *f.* 1?

Radix perennis, valida, ramosa.

Caulis erectus, sæpe bipedalis, teretiusculus, glaberrimus cum nebula glauca, sicut tota planta; superne ramosus, ramis elongatis, rigidis, nudiusculis.

Folia Galbani foliis similia, pinnato-composita; petiolis elongatis, forma et substantia ramulorum.

Foliola ad petiolos ultimæ divisionis ternata aut pinnato-quinata, cuneiformia, margine laterali integerrimo quasi abscisso; antice inciso-serrata, sæpe trifurca, subcarnosa et admodum rigida.

Folia superiora simpliciora, foliolis angustioribus acutioribus; ramea obsoleta, scilicet ad vaginæ angustæ apicem rudimentis tantum foliolorum obsoletorum.

Umbellæ pedunculatæ, fere forma Seseleos annui. *Radii umbellæ* 6 aut 8 crassi.

Involucrum universale nullum.

Umbellulæ glomeratæ, hemisphæricæ, parvæ.

Involucrum partiale brevissimum, connato-monophyllum, multidentatum.

Flosculi subsessiles.

Petala inflexa, acuta, non emarginata, ex albido viridescentia.

Antheræ albæ. *Styli* florentis brevissimi.

Semina ovato-oblonga, sulcata, villis albis hirta.

Odor totius plantæ fortis Apii hortensis.

Floret Julio passim in abruptis lapidosis altioribus circa Kurt-Bulak, et versus fontes rivulorum Pirsagat et Sugaite. ♃.

Obs. Habitus totus imprimis umbellæ de genere nullum prorsus dubium relinquit. Foliolis latiusculis cuneiformibus furcatis facillime a congeneribus distinguitur. Synonymon Morisonii dubium est.

34. Pastinaca *pimpinellifolia*. Nov.

P. foliis pinnatis, foliolis inciso-serratis, inferioribus subrotundis, superioribus oblongis.

Pastinaca orientalis foliis eleganter incisis. *Tournef. Cor. p.* 22. *Buxb. Cent.* 3. *p.* 17. *tab.* 27.

Radix perennis.

Caulis erectus, raro pede altior, tenuis, sulcatus, pubescens, superne in ramos aliquot floriferos divisus.

Folia pinnata, petiolata, utrinque pubescentia, villis exiguis incumbentibus, Pimpinellæ saxifragæ foliis similia et vix majora.

Foliola in inferioribus foliis subrotunda, inciso-serrata, basi antica quasi excisa, postica in lobum producta. In superioribus foliis foliola sensim evadunt longiora et parcius incisa, in supremis autem linearia integra extimo majore, eadem plane ratione qua in Pimpinella Saxifraga.

Radii umbellæ constanter sex.

Involucrum universale sæpe foliolo uno alterove obsoleto caduco; partiale sæpe triphyllum, foliolis minutis subulatis, unilateralibus.

Corollulæ inflexo-emarginatæ, saturate luteæ.

Fructus generis, compresso-planus, non marginatus.

Lecta in graminosis fertilioribus altioribus circa Kurt-Bulak. Floret Julio. ♃.

Obs. Statura humili et foliis Pimpinellæ analogis a congeneribus illico distinguenda.

35. Pimpinella *peregrina*.

P. foliis pinnatis pubescentibus, inferiorum foliolis cordato-ovatis serratis, superiorum oblongis; radiis umbellæ numerosis seminibusque hirtis.

P. *peregrina:* foliis radicalibus pinnatis crenatis, summis cuneiformibus incisis, umbellis nubilibus nutantibus. *Linn. ed. Reich.* 1. *p.* 724.—Pimpinella peregrina *Jacq.*

Radix fusiformis, simplex, alba foris nigricans, biennis.

Caulis erectus, bipedalis et nonnunquam altior, basi simplex, superne divisus in ramos elongatos floriferos, teres, subtiliter striatus, pubesscens basi insignius.

Folia pinnata, petiolata, utrinque leviter pubescentia sicut tota planta.

Foliola ima cordato-ovata, serrata, at vix incisa sive obsoletissime tantum triloba, basi exteriore productiore.

Foliola superiora longiora et angustiora, magis incisa; *suprema* linearia; in ramis præsertim floriferis elongata et pauciora.

Umbellæ ante anthesin terram respicientes, florentes fructiferæque erectæ sunt.

Radii umbellæ numerosi, interiores breviores, hirti, imprimis umbellulam versus.

Involucrum universale rarius foliolo caduco instruitur, sæpissime deficit.

Flosculi numerosi, pedicellati, albi, formæ communis.

Semina forma et magnitudine Pimpinellæ Saxifragæ, pilis albis insigniter hirta.

In graminosis sylvaticis non infrequens. Floret Junio. ♂.

Obs. Affinis Pimpinellæ magnæ; nec umbellæ ante florescentiam nutantes caracterem distinctivum efficiunt, qui potius ab hirsutie herbæ et imprimis seminum, porro a foliolis rameis elongatis, denique ab umbella amplissima radiis numerosis videtur esse repetendus.

36. Pimpinella *Danaa.*

P. involucro utroque, foliis radicalibus decompositis incisis, caulinis minimis, seminibus lævissimis.

Danaa aquilegifolia. *Allion. Pedem.* 2. *p.* 34. *n.* 1392. *tab.* 63.

Ligusticum alterum Belgarum. *Lob. Ic.* 786. Ligusticum alterum herbariorum. *Tabern. ed. Bauh. p.* 205. *Ic.*

In sylvarum altiorum umbrosis haud rara. Floret Junio, Julio. ♃.

Obs. Seminum forma, ad quam in umbelliferis secundum recentiorum plerorumque opinionem potissimum respiciendum est, stirpem hanc ad Pimpinellam referre, suadet; involucrum tamen utrumque et semina lævissima ambiguam reddunt. An igitur ob hanc unicam speciem novum genus a Cl. Allionio constitutum, in systemata introducendum? Cæterum Icon Allionii non ex optimis est, imprimis foliola justo majora sistit. In Tauriæ umbrosis altioribus æque frequens olim a me observata, cum stirpibus Tauricis describetur.

37. STATICE *Echinus.*

S. caule suffruticoso folioso ramoso, foliis confertissimis accrosis, scapis brevissimis floribus alternis obtectis.

Statice Echinus: scapo paniculato, foliis subulatis mucronatis. β. Limonium græcum Juniperi folio. *Tournef. Cor. p.* 25. *Linn. ed. Reich.* 1. *p.* 755.

Tragacantha tota spinosa et Echium referens, unde Echinus herbaceus dicta. *Moris. Hist.* 2. *sect.* 2. *App. tab.* 23. *fig.* 7.

Radix, ut solet in hoc genere, lignosa, valida, emittens denso cæspite caules lignescentes brevissimos, dense ramosos et hemisphæram semipedalis interdum diametri referentes, quæ foliis confertissimis echinata nomen triviale sibi optimo jure vindicat.

Folia antiquiora emarcida ad basin ramorum retrorsum imbricata; juniora recta, accrosa, semiteretia, mucronato-pungentia, punctis minimis albicantibus pubeque vix conspicua glaucescentia.

Scapi vel si malis pedunculi ex apice laterali ramulorum solitarii, simplices, digito breviores, sæpe vix sesquiunciales, toti bracteis floribusque alternis imbricatis obtecti. Squamulæ aliquot subulatæ albo-membranaceæ ad exortum scaporum.

Bracteæ ad singulos flores tres; quarum exterior florem sessilem scapumque ceu vagina amplectitur, oblonga, acuta, carinata, viridis, margine apiceque anguste membranaceis; reliquæ duæ totæ albo-membranaceæ, subæquales, calycis tubum obvolventes, dorso vena purpurea.

Flores figuræ communis, Limonii floribus duplo majores.

Calyx tubo cylindrico, basi parum pubescente, superne striis quinque purpureis in limbum excurrentibus; limbo explanato, scarioso, indiviso margineque crenato, crenis decem subtilissime crenulatis, alternis scilicet iis quæ venis dorsalibus carent minoribus.

Petala calyce longiora, rosea cum vena media obscuriore, oblonga, apicem versus latiora, obtusa.

Stamina vix calycem excedentia.

Pistillum generis, stylis 5, stigmatibus incrassatis.

Crescit hinc inde in abruptis sterilissimis altioribus. Lecta circa fontes rivuli Sugaite. Floret Junio. ♃. ♄.

Obs. Definitio Linnæana a nostra planta adeo est aliena, ut duas diversas species sub St. Echino Linn. latere credibile sit; scilicet nostram, quæ tanquam var. β. proponitur, et alteram ad quam Linnæus definitionem suam adornavit, et quam exprimit: Limonium cæspitosum, foliis aculeatis. *Buxb. Cent.* 2. *p.* 18. *tab.* 10. Buxbaumiana enim planta, scapo elongato paniculato gaudens a nostra manifeste differt, quippe quæ constanter scapos simplicissimos, raro digitalis longitudinis promit, qui fere toti flosculis alternis obteguntur, vel potius ex eorundem pedicellis brevissimis constant; maturescentibus enim seminibus, immo si planta intra chartam exsiccatur, flores cum suis pedicellis decidunt, et eo ipso longe maxima pars scapi ex totidem articulis conflata, evanescit.

38. Statice *lyrata.* Nova.

S. caule herbaceo, foliis radicalibus lyratis, scapo subnudo simplicissimo, spicis elongatis glomeratis.

Statice caule nudo simplicissimo, spicis florum sessilibus alternis, foliis radicalibus ex sinuato-pinnatis. *Gmel. Sib.* 2. *p.* 224. *tab.* 91. *f.* 2.

Radix annua, tenuis, albicans.

Scapus radicalis, digitalis, rarissime dodrantalis, aphyllus, basi teretiusculus, apicem versus acutangulus, villosiusculus. (Non raro scapi aliquot ex eadem radice oriuntur.)

Folia radicalia plura, petiolata, lyrata; lobis sinubusque obtusis; cæterum subvillosa, viridia.

Spica terminalis, et sæpe nonnullæ laterales strictæ, compositæ ex spicis partialibus brevissimis glomeratis, inferioribus alternis, superioribus minoribus atque contiguis.

Bractea sub unaquaque spica partiali sive glomerulo minuta, subrotunda cum acumine, viridis, margine tenuissime albo-membranaceo.

Flosculi parvi, paleis oblongis, apicem versus parum dilatatis margineque villosis, interstincti. *Bractea* singulis flosculis propria, subquadrangula, obtusissima, viridis, calycem obvolvens.

Calyx tubo cylindrico striato basi pubescente, limbo dilatato albo scarioso crenulato et aristis quinque subtilissimis ejus substantiæ munito.

Petala obtusa, rosea.

Stamina vix corolla longiora; filamentis albis, antheris lutescentibus.

Non rara in argillosis subsalsis ad mare Caspium. Floret Junio. ⊙.

Obs. Affinis St. lobatæ et sinuatæ. Differt ab utraque floribus minutis, et ab hac caule non alato. Descriptionem satis curatam cum Icone plantæ totum habitum exprimente dedit Gmelinus loco cit. nihilominus species hæc a recentioribus Systematicis neglecta est.

39. Allium *saxatile*. Nov.

A. scapo nudo tereti, foliis semiteretibus spatha bivalvi brevi, staminibus subulatis corolla longioribus.

Cepa scapo nudo tereti inani, foliis semicylindricis, capitulis spissis multifloris. *Gmel. Sib.* 1. *p.* 63. *tab.* 16. *fig.* 1. 2.

Lectum in abruptis sterilissimis circa Kurt-Bulak. Floret Septembri. ♃.

Obs. In Tauriæ collibus saxosis frequens est, ubi petala constanter lactea sunt cum nervo dorsali viridi: in Caucaso Caspico autem nervus medius semper dilute purpurascit. An Allium Sibiricum Linn.? sed stamina dicuntur corolla breviora, quod non in nostro.

40. Epilobium *rosmarinifolium*†. Curtis Bot. Mag.

E. staminibus declinatis, foliis sparsis linearibus denticulatis caulibusque subpubescentibus, racemis foliatis.

Lysimachia siliquosa speciosa angustifolia. *J. Bauh. Hist. ii. lib.* 21. *p.* 907.

Caules e radice perenni multi, in cespitem collecti, adscendentes, bipedales et ultra, purpurascentes, pubescentes; pube subtilissima et nonnisi facie nebulæ glaucæ, qua caulis inumbratus videtur, apparente.

Rami floriferi nonnulli versus apicem caulis.

Folia sparsa, linearia, angustiora quam E. angustifolii, sessilia, margine denticulis minimis ceu glandulis purpurascentibus; cæterum viridia, cum nebula fugaci glauca præsertim versus basin. Folia juniora sæpe fasciculatim ex axillis primariorum inferiorum nascuntur.

Racemi terminales simplices, foliati; scilicet bracteis, e quarum axillis flores prodeunt foliis similibus, minoribus tantum.

Pedicelli brevissimi.

Calyx tetraphyllus, germini lineari infero albo-tomentoso oblique insistens; foliolis linearibus, acutis, purpurascentibus, pubescentibus, petalis paullo brevioribus.

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† Epilobium angustissimum *Curtis Bot. Mag.* Edit. Ang.—Ed.

Petala calycinis foliolis interjecta, patentissima, æqualia; unguibus brevibus, limbo roseo, ovato, obtuso, sed minus quam in Ep. angustifolio.

Stamina 8 declinata, fere corollæ longitudine; filamentis tenuibus cærulescentibus; antheris luteis, polline cæruleo.

Stylus fere longitudine staminum, amethystinus, basi villis albis pubescens; *stigma* minutum trilobum.

Frequens ad margines lapidosos rivulorum e. g. rivi Pirsagat prope Veterem Schamachiam. Floret Augusto. ♃.

Obs. Ab Epilobio angustifolio Linn. discedit foliorum angustia et denticulis lateralibus minutissimis crebrioribus, pube, bracteis sive foliis floralibus, petalorum limbo paullo minus dilatato, stigmate minuto. Propius videtur accedere ad Epilobium Dodonæi. *Allion. Pedem.* 1. *n.* 1016. *et* ad Epil. angustifolium *Lamarck Dict.* 2. *p.* 374.

41. Polygonum *salsugineum.* Nov.

P. floribus subpentandris trigynis axillaribus, foliis lineari-subulatis, seminibus calycibus duplo longioribus.

An Polygonum maximum longissimis cauliculis et foliis. *Moris. Hist.* 2. *sect.* 5. *p.* 591. *Tournef. Inst. p.* 510?

Radix annua, simplex, alba.

Caulis pedalis et altior, erectus, inde a basi ramosissimus; ramis patentissimis, elongatis, gracilibus, teretibus, subtilissime striatis, glabris sicut tota planta; geniculis purpurascentibus.

Folia distantia, lineari-subulata, margine revoluto, lævia, caduca, stipulis imposita.

Stipulæ amplexicaules, breves, margine ciliato laceræ, florales folio destitutæ.

Flosculi axillares, subterni, brevissime pedunculati, polygoni avicularis floribus minores.

Calyx viridis, monophyllus, quinquedentatus, dentibus subæqualibus, minutis, angustis, rectis.

Stamina mihi quinque visa, longitudine calyce, antheris globoso-didymis, flavis.

Germen oblongum, stamina æquans. *Stylus* nullus. *Stigmata* tria, minima, albida.

Semen nigricans, triquetro-pyramidale, calyce duplo longius.

Crescit passim in argillosis schistosis, bitumine et sale imbutis, sterilissimis. Copiosius in vicinia Veteris Schamachiæ. Floret Augusto, Septembri. ⊙.

Obs. Abunde differt a Polygono aviculari ejusdemque varietatibus sive speciebus affinibus angustifoliis. Semine pyramidali Stelleris affine. Staminum numerus difficillimus est observatu, ob flores exiguos et antheras admodum fugaces.

* Ruta *linifolia.* Linn.

R. foliis lanceolatis subsessilibus glabris, paniculæ ramis pubescentibus, petalis ovatis.

R. *linifolia:* foliis lanceolatis indivisis. *Linn. ed. Reich. ii. p.* 266.

Ruta sylvestris linifolia hispanica. *Barrel. Icon.* 1186. *Tournef. Inst. p.* 257.

Caules e radice perenni nonnulli, simplices, circiter pedales, inferne glabri, superne pubescentes.

Folia lanceolata, integerrima, glabra, glaucescentia, opaca, scilicet punctis pellucidis nullis notata qualia in affinibus observantur, omnia subsessilia.

Paniculæ subcorymbosæ rami insignius pubescunt.

Calycina foliola subrotunda, lævia, parva, viridia.

Petala ovata, obtusa, lutea, dorso subtus præsertim apicem versus viridia.

Stamina decem, basi interiore parum villosa.

Lecta in Tauriæ collibus siccis. Floret Maio, Junio. ♃.

Obs. Plantam hanc et duas affines Rutam Dauricam et perforatam, in Caucaso Caspico non repertas, ideo hic tracto, ut Rutæ foliis simplicibus gaudentes, quot quot mihi hucusque innotuerunt, ordine suo definitæ melius innotescant, earumque discrimina facilius agnoscantur. Rutæ perforatæ specimina e Sibiria accepta, mecum benevolentissime communicavit Cl. et amicissimus Stephan.

* RUTA *daurica.*

R. foliis lanceolatis subsessilibus glabris, paniculæ ramis lævibus, petalis ovatis. Ruta foliis simplicibus alternis. *Gmel. Sib.* 4. *p.* 176. *n.* 95. *tab.* 68. *fig.* 1.

Harmala montana Daurica perennis, multicaulis, Polygalæ folio, flore albo et luteo. *Amman. Ruth. n.* 91, 92. Peganum dauricum: foliis indivisis. *Linn. ed. Reich.* ii. *p.* 421.

Planta præcedenti affinis statura et habitu.

Caules simplices toti glabri.

Folia antecedente paullo minora et acutiora, punctis pellucidis notata, margine obsolete serrulata, tamen lævia.

Paniculæ rami glabri, graciliores quam præcedentis.

Flores pauci, antecedentis magnitudine.

Calycina foliola minuta.

Petala ovata, obtusa, lutea, extus dorso sæpe viridia.

Stamina certe decem, filamentis parum villosis.

Capsula forma rutæ, et sæpe tantum triloba.

Variet. β. floribus albis Ammannus describit loc. cit.

42. RUTA *villosa.* Nov.

R. foliis lanceolatis petiolatis cauleque villosis, petalis oblongis, filamentis basi lanatis.

Ruta orientalis Linariæ folio, flore parvo. *Tournef. Cor. p.* 19. *Buxb. Cent.* 2. *p.* 30. *tab.* 28.

Habitus antecedentium.

Folia brevibus petiolis insistentia, integerrima, utrinque pubescentia sicut caulis, punctis pellucidis notata, inferiora breviora petiolis longioribus.

Panicula subcorymbosa, floribus minoribus numerosis, confertis.

Calycina foliola minutissima, ut vix nudo oculo conspiciantur.

Petala angusta, parva, tota lutea.

Stamina decem, basi interiore villis albis hirsutissima et quasi lanata.

Habitat in provinciæ Schirvan editis apricis circa saxum Beschbarmak, ubi olim Buxbaumius quoque collegit. Floret Junio, Julio. ♃.

Obs. Huic affinis videtur Ruta fruticulosa, foliis integris sessilibus ovato-lanceolatis ramisque pilosis. *La Billardière Syr. Dec.* 1.

* Ruta *perforata.* Nov.†

R. foliis ovato-lanceolatis petiolatis cauleque glabris, petalis oblongis.

Præcedentibus altior et ramosior, tota glaberrima et subglaucescens.

Folia ovato-lanceolata, latiora quam antecedentium, petiolis brevibus insistentia, pellucido-punctata.

Flores forma et magnitudine Rutæ villosæ, sed filamenta basi villis multò parcioribus vestita nec lanata.

Habitat circa mare Baikal, unde primus attulit B. Sievers, Pharmacop. Kiacktensis. ♃.

43. Dianthus *plumarius?*

D. floribus subsolitariis, squamis calycinis senis ovato-lanceolatis calyce triplo brevioribus, corollis multifidis.

An *D. plumarius:* floribus solitariis, squamis calycinis subovatis brevissimis, corollis multifidis fauce pubescentibus. *Linn. ed. Reich.* 11. *p.* 336?

Radix perennis lignosa cespitans; a qua foliorum fasciculi et

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† Non differt a planta Tournefortiana sec. *Willd. Sp. Pl.* 2. *p.* 545.—Ed.

Caules nonnulli, circiter semipedales, erecti, simplices, sæpe uniflori, quandoque ramo uno alterove florifero laterali, teretiusculi, glabri.

Folia ut solent in hoc genere linearia, acuta, glabra margine scabriuscula; caulina superiora brevia submembranacea striata, quorum supremum par, interdum sub ipso calyce situm, squamas calycinas mentitur.

Flores magnitudine D. Caryophylli.

Calyx cylindricus longus, dentibus acuminatissimis quasi aristatis, squamis baseos sex, tubo triplo brevioribus, ex ovato-lanceolatis cum acumine medio parum elongato; exteriores duæ minores.

Petala incarnata, immaculata, unguibus calyce paullo longioribus, limbo ovato antice ciliato-lacero.

Stamina et *Pistillum* formæ communis.

Color totius plantæ e viridi in glaucum vergens.

Crescit hinc inde in editis inter Kubam et Schamachiam. Floret Julio. ♃.

44. CUCUBALUS *Royeni*. Nov.

C. racemo verticillato, pedunculis oppositis brevissimis multifloris, petalis bifidis, foliis ovato-lanceolatis subundulatis.

Cucubalus foliis amplexicaulibus, floribus verticillatis pedunculatis erectis. *Royen Lugd. Bat. p.* 448.

Radix biennis.

Caulis erectus, simplicissimus, sesquipedalis aut bipedalis, teretiusculus, villoso-viscidus, imprimis superne.

Folia ovato-lanceolata, subundata, pleraque integerrima, nonnulla interdum dente elongato laterali; *caulina* semiamplexicaulia, adscendendo breviora; *floralia* brevia acuminata; omnia utrinque villoso-viscida sicut tota planta.

Racemus terminalis, simplex, longus, verticillatus, scilicet pedunculo utrinque ex axilla folii floralis brevissimo, e quo

Flores quinque aut plures, singuli pedicello recto vix calycis longitudine insistentes, magnitudine circiter Silenes nutantis.

Calyces cylindrici, decemstriati, quam maxime viscidi.

Petala albida, semibifida, coronula destituta.

Genitalia corolla longiora.

Calyces fructiferi ventricosiores et subcavati.

Semina minima, punctulato-scabra, atra.

Lectus passim in planitie Kumükorum. Floret Majo. ♂.

Obs. Affinis Cucubalo viscoso, ad quem Linnæus, quamvis dubius, Synonymon Royeni retulit. Differt foliis latioribus floribusque erectis nec undique decumbentibus.

45. Silene *suffrutescens*. Nov.

S. (floribus ex dichotomia caulis) caulibus basi lignescentibus, foliis spatulato-lanceolatis, calycibus cylindricis 10-striatis, petalorum limbo bipartito, margine baseos utrinque unidentato.

Suffrutex humilis, divaricatus, habitu Silenes fruticosæ.

Caulis basi lignescens, *ramis* floriferis herbaceis elongatis teretibus, superne paniculatis subdichotomis, leviter pubescentibus sicut tota planta.

Folia oblonga, apicem versus latiora, in medio acutiuscula, margine scabra; *caulina inferiora* sæpe foliorum secundariorum fasciculo axillari; *ramea superiora* longiora et angustiora.

Pedunculi longi, cylindrici, striis decem obscurioribus instructi, pubescentes.

Petala bipartita, e purpureo in spadiceum vergentia, denticulo utrinque minuto marginali supra coronulam faucis.

Genitalia formæ communis in hoc genere, calyce longiora. *Antheræ* luteo-virides.

Capsula ovata, intra calycem pedunculata; quo fit, ut calyx fructus clavatus videatur.

Occurrit hinc inde ad latera collium lapidosorum inter Kubam et Veterem Schamachiam. Floret Junio, Julio. ♄. ♃.

Obs. Planta affinis Cucubalo fruticuloso Pall. at corona faucis etiam genere differre probat.

46. Cotyledon *sempervivum*. Nov.

C. fasciculis globosis e foliis cuneiformibus integris margine ciliato-scabris, scapis radicalibus, panicula oblonga laxa.

Radix perennis, passim emittens foliorum rosulas globosas more Sempervivi.

Folia numerosa, dense imbricata, cuneiformia, lata et brevia, angulis lateralibus rotundatis paullo productioribus, margine toto ciliis brevissimis scabro; cæterum carnosa, vix pubescentia.

Scapi radicales simplicissimi, spithamæi, tenues, semiteretes, pubescentes.

Panicula terminalis, oblonga; pedunculis alternis, brevibus, bi- aut trifloris, villoso-viscidis.

Bracteæ minutæ, lanceolatæ, obtusiusculæ.

Flores Sedi Telephii floribus paullo majores.

Calyx 5-partitus, villoso-viscidus; segmentis lanceolatis, longitudine tubi corollæ.

Corolla monopetala, 5-fida, colore Sedi Telephii; tubo germinibus adpresso; limbo erectiusculo laciniis oblongis acutis.

Stamina 10; *filamentis* tubo corollæ insertis eademque brevioribus, *antheris* parvis globoso-didymis purpureis.

Pistilla 5 supera, oblonga, superne angustata; stigmate minimo.

Capsulæ 5 polyspermæ.

Occurrit rarius in saxis montium altiorum. Floret Junio. ♃.

Obs. Folia Sempervivi; flores Cotyledonis.

47. **Stachys** *fruticulosa.* Nov.

S. caule lignescente ramosissimo divaricato, foliis elliptico-lanceolatis subintegris, verticillis paucifloris.

Suffrutex humilis, ramosissimus, divaricatus.

Rami floriferi adscendentes, vix dodrantales, teretiusculi, villis incumbentibus pubescentes.

Folia omnia uniformia, sessilia, elliptico-lanceolata, obtusa nec medio mucronata, plerumque integerrima et raro tantum obiterque crenata, non magna, eodem modo quo rami pubescentia.

Flores forma et magnitudine Stach. rectæ, ad folia superiora verticillati, breviter pedunculati; verticillis paucifloris, sæpissime bifloris, scilicet utrinque flore axillari solitario.

Calyx 10-striatus, 5-dentatus; dentibus æqualibus mucronatis, mucrone reflexo-patulo.

Corolla alba. *Stamina* generis.

Semina pleraque abortientia, adeo ut communiter tantum unicum ad maturitatem perveniat, majusculum, læve, rufescens cum nebula obscuriore.

Lecta in abruptis lapidosis aridissimis excelsis cum Statice Echino. Floret Majo, Junio. ♄.

48. **Scrophularia** *variegata.* Nov.

S. caulibus basi lignescentibus, foliis bipinnatifidis pubescentibus, racemis elongatis, pedicellis brevibus villis glochidibus hirtis.

Radix perennis, lignosa, multiceps.

Caulis basi lignescens divaricatus; cespitatim emittens ramos numerosos, herbaceos, elongatos, graciles, striato-angulatos, pubescenti-scabros sicut tota planta.

Folia composita, bipinnatifida; segmentis baseos minoribus, oppositis, grosse serratis; terminali maximo inciso-serrato; superiorum lobis lateralibus cum terminali confluentibus.

Racemi terminales elongati, foliosi; pedunculis ad axillas

foliorum

foliorum floralium alternorum et minutorum solitariis, brevissimis; inferioribus trifloris biflorisve, superioribus unifloris, omnibus villis brevissimis apice glochidibus hirtis.

Flores paullo minores quam Scroph. caninæ.

Calycina foliola subrotunda, obtusissima, viridia, margine tenuissime albo-membranaceo.

Corolla purpurascens, maculis albis notata. Labium superius laciniis duabus brevibus obtusis incumbentibus, altera macula alba. Labium inferius trifidum, album, laciniis minimis obtusis.

Stamina generis. *Stylus* deflexus, labio inferiori incumbens.

Capsula subglobosa, magnitudine Pisi, stylo persistente et rigescente acuminata.

Semina minutissima, punctulato-scabra, atra.

Crescit ad margines lapidosos rivulorum nec non in collibus sterilibus hinc inde. Floret Junio, Julio. ♄. ♃.

Obs. Videtur Scroph. caninæ proxima, a qua differt radice perenni, caulibus ramosis basi lignescentibus, pube caulis et pedunculorum, floribus albo-maculatis.—Speciei affinis Tauricæ definitionem subnecto.

* Scrophularia *chrysanthemifolia.* Nov.

S. foliis bipinnatifidis glabris, segmentis linearibus incisis, racemis paniculatis, pedunculis subdichotomis.

Scrophularia orientalis Chrysanthemi folio, flore minimo variegato. *Tournef. Cor. p.* 9.

S. *pinnata:* foliis pinnatis, foliolis incisis, racemis simplicissimis terminalibus. *Mill. Dict. n.* 15 ?

Haud rara in lapidosis Tauriæ montosæ. Floret Majo, Junio. ♃.

Obs. Scrophulariæ lucidæ proxima, et foliis glaberrimis subcarnosis gaudens.

49. OROBANCHE *Phelypæa.*

O. caule simplici unifloro, calyce nudo quinquefido, foliolis tribus superioribus erectis conniventibus.

Lathræa *Phelypæa. Linn.*

Phelypæa orientalis flore coccineo. *Tournef. Cor. p.* 47.

Radix pro more generis in aliarum plantarum radicibus parasitica;

Caulem promens mox unicum, mox nonnullos simplicissimos, dodrantales, spadiceos, squamosos, Orobanches majoris caulibus simillimos.

Flos terminalis, solitarius, sessilis, speciosus, ringens et ob hanc rationem unaversum inclinatus, Orobanches majoris flore triplo major.

Calyx 5-fidus cauli concolor; segmentis tribus superioribus erectis, conniventibus, oblongis, canaliculatis; duobus inferioribus longioribus et acutioribus antrorsum flexis corollæque tubo sub labio inferiore incumbentibus.

Corolla speciosa, pro more generis extus pube subviscida tenuissima instructa, lutescens; intus holosericeo et colore præstantissime coccineo insignis.

Labium superius bipartitum, laciniis obtusis integris; *labium inferius* planum, tripartitum; laciniis subæqualibus, obtusiusculis. *Faux* maculis duabus magnis nigerrimis.

Stamina corolla breviora, exteriora interioribus longiora. *Antheræ* basi bifidæ, bisetæ.

Stylus longitudine staminum; *stigma* capitato-hemisphæricum.

Capsula generis.

Primum lecta in collibus graminosis circa Fortalitium Alexandrinum et Moscoviense in districtu Caucaso Circassiorum finitimo; postea hinc inde in umbrosis altioribus Dagestani et Schirvani visa. Me quidem judice ad Orobanchen potius quam ad Lathræam referenda. Floret Majo, Junio. ♃.

50. Alyssum *alpestre.*

A. caulibus suffruticosis diffusis, foliis brevibus obtusis incanis, racemis subsolitariis, siliculis ellipticis.

A. *alpestre:* caulibus suffruticosis diffusis, foliis subrotundis incanis, calycibus coloratis. *Linn. Sp. ed. Reich.* 3. *p.* 233.

Alyssum caulibus fruticulosis diffusis, foliis subrotundis incanis. *Gerard Provinc. p.* 352. *tab.* 13. *fig.* 2.

Alyssum alpestre. *Lamarck Dict. Enc. Bot.* 1. *p.* 97. *n.* 4.

Caules basi sublignescentes, declinati, ramosissimi.

Folia inferiora conferta, basin versus attenuata apice latiora, obtusiuscula, incana; superiora longiora et angustiora.

Racemi terminales, elongati, simplices.

Flores Alyssi montani floribus paullo minores.

Calycina foliola oblonga, concava, torulosa, coloratiuscula, erecta.

Petala lutea, obtusiuscula et vix emarginata.

Stamina 2 breviora basi inter germen, squama setacea ipsis dimidio breviore, 4 longiora supra medium utrinque denticulo minimo instructa.

Silicula elliptica, forma Drabæ vernæ, stylo persistente coronata, bilocularis; loculis monospermis.

Lectum in abruptis aridis ad Kurt-Bulak. Floret Majo. ♃. ♄.

Obs. Silicula elliptica caracterem distinctivum hujus speciei longe optimum præbet. Speciei affinis Tauricæ definitionem subjungo.

* Alyssum *subalpinum.* Nov.

A. caulibus suffruticosis diffusis, foliis subrotundis incanis, racemis subcorymbosis, siliculis orbicularibus.

Non rarum in rupestribus et lapidosis Tauriæ montosæ. Floret Majo. ♃. ♄.

Obs. Habitus totus et folia antecedentis, at racemis pluribus ad ramorum apices corymbos efformantibus et siliculorum forma facile dignoscendum: Alysso quoque montano haud mediocriter affine cum eo ab autoribus confusum fuisse videtur; sed racemi etiam Alyss. montani solitarii simplices, calyces non colorati, nec caules basi lignescentes; staminum denique structura diversa. In Alysso subalpino squamulæ 6 subæquales, oblongæ, apice subtilissime denticulatæ circa germen connivent; quibus stamina 4 longiora margine laterali, et 2 breviora dorso adnata sunt: in Alysso montano stamina 4 longiora infra medium denticulo laterali instruuntur; breviora vero originem ducunt e basi dorsali squamulæ oblongæ apice subtilissime denticulatæ, denticulo medio acutiore.

51. Cheiranthus *cuspidatus.* Nov.

C. foliis lanceolatis dentatis, caule recto simplici, siliquis strictis late ancipitibus stylo persistente duplo longioribus.

Turritis montana siliquis latis. *Buxb. Cent.* 2. *p.* 23. *tab.* 33. *f.* 1.

In collibus graminosis ad sylvarum margines obvius, in Chersoneso Taurica frequentior. Floret Maio, Junio. ♂.

Obs. Cheir. montano Pall. proximus, foliis dentatis et siliquæ stylo breviore dignoscendus. Cheir. montani sequens erit definitio.

* Cheiranthus *montanus*[†].

C. foliis lanceolatis integerrimis, caule recto simplici, siliquis strictis late-ancipitibus longitudine styli persistentis.

Cheiranthus *montanus. Pallas Itin.* 1. *p.* 496. *App. n.* 115.

Cheiranthus *cornutus:* foliis linearibus integerrimis canaliculatis recurvis, floribus subsessilibus, siliquis brevibus longo stylo terminatis. *Lamarck Dict. Enc. Bot.* 2. *p.* 717. *n.* 8.

[†] Cheiranth. quadrangulus *L'Herit.—Willd. Sp. Pl.* 3. *p.* 525.—Ed.

Lectus in Tauria ad littora maris arenosa prope Theodosiam. Floret Junio. ♂.

52. CHEIRANTHUS *odoratissimus.*

C. foliis lyrato-sinuatis tomentosis; siliquis longissimis ancipitibus, stigmate bilobo terminatis, caule suffruticoso.

Cheiranthus odoratissimus. *Pallas Tabl. de la Tauride. App.*

Hesperis angustifolia V. foliis sinuato-dentatis subruncinatis. *Lamarck Dict. Enc. Bot.* 3. *p.* 322. *n.* 5.

Lectus in abruptis ad rivum Pirsagat prope Veterem Schamachiam. In Tauriæ cretaceis frequentior. Floret Aprili, Majo. ♄.[†]

53. LAVATERA *biennis.* Nov.

L. herbacea, foliis inferioribus cordatis crenatis subrotundo-lobatis, summis oblongis trilobis lobo medio maximo, pedunculis elongatis solitariis, petalis truncatis.

Radix simplex biennis videbatur.

Caulis erectus, simplex, sesquipedalis aut bipedalis, pubescenti-scaber.

Folia alterna petiolata; *inferiora* cordato-rotundata, subquinqueloba; lobis acutiusculis serratis, baseos minoribus; *superiora* magis oblonga; *suprema* lanceolata, triloba, lobis lateralibus minimis: omnia eodem modo quo caulis totaque planta pubescenti-scabra, nullo tomenti vel canitiei vestigio.

Stipulæ minutæ, subulatæ, integræ.

Pedunculi ex axillis foliorum superiorum solitarii, elongati scilicet calyce vel quadruplo longiores, tenues, uniflori.

Flores forma et magnitudine Lavateræ trimestris.

[†] *Willd. Sp. Plantar.* 3. *p.* 524.—ED.

Calyx generis; exterior trifidus, lobis ex ovato-orbiculatis, cum acumine medio brevi mutico; interior quinquefidus, segmentis ex ovato-lanceolatis.

Petala levissime emarginata et quasi truncata, formæ communis et colore roseo Lavat. trimestris.

Semina nuda, nullo orbiculi vestigio formæ communis.

Occurrit passim in pascuis graminosis et ad agrorum versuras. Floret Junio, Julio. ♂.

Obs. A Lavatera trimestri defectu orbiculi semina tegentis abunde differt: a Lavatera thuringiaca discrepat: habitu omnino graciliore, caule e radice verisimiliter bienni sæpissime tantum unico simplicissimo, floribus magis distantibus et pedunculis imprimis fructiferis gracilioribus et longioribus, petalis magis conniventibus et vix emarginatis nec profunde excisis ut in Lav. thuringiaca, denique pube rariori et asperiori nec molliuscula vel in tomenti speciem abeunte.

54. Lathyrus *rotundifolius*. Nov.†

L. pedunculis multifloris, cirrhis diphyllis, foliolis subrotundis, internodiis nudis.

Occurrit in nemoribus sub fruticibus quibus innititur. Floret Majo. ♃.

Obs. Elegantem hanc speciem in Tauriæ quoque nemoribus occurrentem curatius in Flora hujus Chersonesi describam. Floret tempore vernali cum Orobis. Orobus sylvaticus foliis circa caulem auriculatis. *Buxb. C.* 3. *p.* 22. *tab.* 41. huic non absimilis est, sed stipulæ in nostro non sunt adeo magnæ.

55. Ervum *tenuissimum*. Nov.

E. pedunculis filiformibus subunifloris, calycibus brevissimis.

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† An Lathyrus rotundifolius *Willd. Sp. Pl.* 3. *p.* 1088.—Ed.

Haud infrequens in graminosis apricis. Floret Majo. ☉.

Obs. Ervo tetraspermo affine et forte ab autoribus cum eo confusum: etenim in Tauria et per totum tractum Tanaicensem non rarum, olim in Germania quoque meridionali, mihi ni fallor, occurrit. Ervum tetraspermum *Leers Fl. Herborn.* et *Lamarck Dict. Enc.* potius ad nostram speciem quam ad E. tetraspermum Linn. pertinere videtur. Differt ab hoc: foliolis paucioribus, cirrhis longis simplicissimis, pedunculis apice vix in mucronem protractis, floribus omnium minimis, calycinis dentibus brevissimis.

56. Astragalus *onobrychioides*. Nov.

A. (caulescens erectus) pubescens, foliis petiolatis, foliolis ellipticis, spicis subcapitatis longissime pedunculatis, calycinis dentibus bracteisque acuminatis, vexillo elongato, leguminibus oblongis erectis.

Astragalus orientalis canescens, capitulis Trifolii bituminosi, flore dilute purpureo. *Tournef. Cor. p.* 28 ? †

Radix lignosa, valida.

Caules e stipite baseos sublignescente aliqui, recti, vix pedales, simplices, basi foliosi pube adpressa sericea canescentes, superne nudiusculi, sulcati, virides attamen pubescentes.

Folia alterna, petiolata, eadem pube qua basis caulis canescentia.

Petioli tenues, longi scilicet foliolorum conjugationibus longo demum a caule intervallo incipientibus.

Foliola a 10- ad 15-juga cum impari, opposita aut alterna, Astragali Onobrychis foliolis breviora, elliptica, parva.

Stipulæ oppositifoliæ, amplexicaules, albo-membranaceæ, bifidæ; laciniis subulatis, villosis margineque quasi ciliatis.

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† Vid. *Willd. Spec. Plantar.* 3. *p.* 1261.—Ed.

Spicæ florum breves, subcapitatæ, terminales.

Bracteæ subulatæ, membranaceæ, villosæ imprimis margine, longitudine calycis.

Flores fere magnitudine et forma Astragali Onobrychis.

Calyx albido-villosus intermixtis villis parcis nigris; dentibus acuminatis hirsutis, longitudine tubi.

Corolla purpurea, colore dilutiore quam Astr. Onobrychis.

Vexillum alis carinaque duplo longius obtusum. *Alæ* integræ.

Legumina non racemosa, sed potius in capitulum congesta, erecta, brevia, subtus gibba, acuminata, villis mixtis albis nigrisque hirta.

Semina reniformia, atra, nitida.

In collibus lapidosis non infrequens, imprimis circa Kurt-Bulak. Floret Maio, Junio. ♃.

OBS. Astragalum Onobrychin refert, quamvis certe diversus et spica subcapitata brevissima, bracteis subulatis, calycinis dentibus acuminatis, nec non foliis longe petiolatis distinguendus.

57. ASTRAGALUS *pilosus β. flore pallido.*

A. (caulescens erectus) villosus, foliolis elliptico-lanceolatis, spicis longe pedunculatis brevibus, carina unguiculata, leguminibus oblongis erectis.

Astragaloides montana incana major albo flore. *Barrel. Icon.* 557.

Radix perennis.

Caules erectiusculi, vix pedales, simplices, teretes, molliter villosi.

Stipulæ breves, amplexicaules, acuminatæ.

Foliola circiter 10-juga cum impari, sæpe alterna, elliptico-lanceolata, utrinque villosa, vix incana.

Pedunculi axillares, firmi, elongati, sulcati; inferiores longissimi.

Flores racemosi, non multi, conferti, breviter pedunculati.

Bracteæ subulatæ, minimæ, villosæ.

Calyx villosus pilis mixtis atris raris, nec canescens; dentibus brevibus subæqualibus.

Corolla pallide flavescens ad ochroleucum vergens.

Vexillum ovatum, emarginatum, alis paullo longius; *alæ* semisagittatæ, apice obsolete emarginatæ; carina basi laterali utrinque gibba, unguiculo lineari longitudine dentis calycini terminata; qua nota hæc species a compluribus affinium facillime dignoscitur.

Legumina racemosa, imbricata, fere forma leguminum antecedentis speciei, oblonga, mucronata, supra canaliculata, subtus subcarinata, villosa.

Semina reniformia, parva, nigro-nitida.

Occurrit cum præcedente et eodem tempore floret. ♃.

* ASTRAGALUS *pilosus α. flore saturatiore.*

A. villosissimus, foliolis elliptico-lanceolatis, pedunculis folio longioribus, spicis cylindricis, carina unguiculata, leguminibus oblongis erectis.

A. *pilosus:* caulescens erectus pilosus, floribus spicatis, leguminibus subulatis pilosis. *Linn. ed. Reich.* 3. *p.* 526.

Crescit in collibus siccioribus Tauriæ. Floret Majo, Junio. ♃.

OBS. Astragalus pilosus α et β, ille in Tauria, hic in Caucaso Caspico lectus, tot notis conveniunt, ut utrumque specie separare non audeam. Differt α a β villositate majore, pedunculis minus elongatis, spicis longioribus floribusque numerosioribus, bracteis longitudine calycis, dentibus calycinis magis acuminatis, corollis saturatius luteis.

58. ASTRAGALUS *varius.*

A. (caulescens erectus) pubescens, foliolis lineari-lanceolatis, racemis elongatis longe pedunculatis, floribus subsessilibus distantibus, leguminibus ovato-oblongis erectis.

Astragalus *varius*. *S. G. Gmelin Itin.* 1. *p.* 116. *tab.* 17.

Astragalus *varius*: caulescens erectus, floribus longe spicatis laxis erectis, stipulis nigricantibus. *Lamarck Dict. Enc. Bot.* 1. *p.* 313. *n.* 21.

Radix perennis, e qua

Caules nonnulli, erecti, sesquipedales, parum ramosi, teretiusculi, pube incumbente sericea vestiti.

Folia pinnata; *foliolis* quinquejugis aut ultra, lineari-lanceolatis, acutis, semunciam longis, pubescentibus sicut caulis.

Stipulæ parvæ, lanceolatæ.

Racemi versus apicem caulis axillares, elongati caulemque sæpe superantes, longe pedunculati.

Flores alterni, minime imbricati, erectiusculi, subsessiles, magnitudine nec forma Astragali Onobrychis.

Bracteæ minimæ, subulatæ.

Calyx villosus, villis albis et atro-purpurascentibus mixtis; dentibus 5 subulatis, subæqualibus, margine albido-villosissimis.

Vexillum cæruleum, ex ovato-oblongum, obtusum, alis longius neque vero duplo. *Alæ* semicordatæ, acutiusculæ, cæruleæ. *Carina* alis brevior, obtusa, pallida, macula apicis saturatiore.

Legumina erecta, ex ovato-oblonga, acuta, villosa, non magna, fere forma leguminum Astr. Onobrychis.

Lectus in arenosis ad mare Caspium circa Tarki et Derbentum. Floret Junio. ♃.

Obs. Stipulas caulemque sub illis nigris villis valde pubescere et quasi barbatum esse asserit Cl. Lamarck loc. cit.: quod fortasse in culto obtinet; in spontaneo villi isti sæpe desunt, nec unquam adeo conspicui, ut definitionem speciei intrare mereantur.

59. Astragalus *sanguinolentus*. Nov.

A. (scapo nudo, absque caule folioso) pubescens, scapis foliis longioribus declinatis paucifloris; foliolis ellipticis supra glabris, leguminibus erectiusculis oblongis, arcuatis compressis.

Radix perennis, lignosa, valida, apice multiceps, e qua ceu ex stipite lignescente foliorum fasciculi scapique denso cespite originem ducunt.

Folia humi strata, petiolata; *foliolis* parvis, circiter 10-jugis cum impari, ex elliptico subrotundis, obtusissimis et levissime emarginatis, e viridi glaucescentibus, supra glabris, subtus villis incumbentibus pubescentibus.

Scapi circiter digitales, foliis longiores, supini, teretes, pubescentes eodem modo quo foliolorum pagina inferior.

Flores terminales non multi, vix quinis plures, brevissime pedicellati, erecti, magnitudine et forma florum Astr. exscapi.

Bracteæ subulatæ, vix pedicello longiores.

Calyx cylindricus, pubescens villis albis nigrisque incumbentibus, 5-dentatus; denticulis æqualibus, acutis, brevibus.

Vexillum calyce duplo longius, margine apicem versus reflexo, emarginatum, ex albido dilutissime purpurascens imprimis basi superne.

Alæ vexillo haud multo breviores, albæ, apice laterali obsolete emarginatæ. *Carina* alis brevior, obtusa, alba, macula apicis magna eleganter cyanea.

Legumen forma Viciæ, erectiusculum, oblongum, compressum sutura crassiore, arcuatum, styli basi rigescente acuminatum, eadem qua calyx pube instructum sutura magis pubescente, punctis numerosis sæpe confluentibus purpureis adspersum, biloculare polyspermum more generis.

Lectus cum Alchemillæ speciebus, Thymis, Helianthemo et aliis in editis locis circa Kurt-Bulak. Floret Majo, Junio. ♃.

Obs. Polygala *Camerarii Epit.* 929. quæ ab autoribus ad Astragalum monspessulanam trahitur, totum nostri habitum exprimit, quamvis leguminum angustia et longitudine videatur diversa. Nomen triviale a macula carinæ et a leguminibus punctis rubris adspersis desumsimus.

60. Medicago *glutinosa.* Nov.

M. pedunculis racemosis, leguminibus reniformi-contortis calycibusque villoso-viscidis, caulibus suberectis pubescentibus.

Planta perennis, statura et modo crescendi Medic. sativæ affinis.

Caules e radice aliquot, in loco natali ordinario nempe in graminosis exaltatis fertilioribus erecti, in siccis declinati, leviter pubescentes.

Stipulæ lineari-subulatæ; inferiores basi denticulatæ, superiores integræ.

Foliola inferiora ovata, superiora cuneiformia, argute-serrata margine baseos integro.

Racemi axillares pedunculati; pedunculis firmis, rectis, striatis, circiter sesquiuncialibus.

Flores formæ communis in hoc genere, Medicaginis sativæ floribus paullo majores.

Calyx pedicellique pilis erectis apice liquorem viscidum secernentibus obsiti.

Corolla pallida, mox in ochroleucum vergens, colore Loti siliquosæ, vexilli medio et carinæ disco saturatioribus; mox dilute cærulescens, vexillo obscurius lineato, carinæ autem disco constanter luteo.

Legumina in figuram reniformem contorta, integra, villoso-viscida sicut calyces.

Occurrit in montium graminosis fertilioribus, circa Kurt-Bulak frequens; nec in lapidosis siccis plane exulat. Floret Junio. ♃.

Obs. Medicagini sativæ affinis; viscositate calycum leguminumque, nec non florum colore constanter pallidiore dignoscenda.

61. Scorzonera *eriosperma.* Nov.

S. foliis lineari-subulatis canaliculatis cauleque basi sublanatis, seminibus tomento candidissimo vestitis.

Scorzonera cretica angustifolia, semine tomento candidissimo. *Tournef. Cor. p.* 36.†

Radix formæ communis in hoc genere.

Caules multi, adscendentes, simplices, basi foliosi sublanati, superne nudi, glabri, uniflori.

Folia graminea, linearia, longa, acuminata, canaliculata, dorso carinata, nervosa, basi eodem modo quo caulis lana vaga albissima instructa.

Flores Scorzoneræ hispanicæ floribus minores.

Calycinæ squamæ exteriores duplo breviores circiter 10; interiores 8 læves.

Corollulæ haud multæ, luteæ, extimæ subinde tinctura levi purpurea.

Genitalia concoloria.

Semina tota tomento sericeo candidissimo tecta.

Pappus plumosus, multisetus.

In graminosis altioribus, nec non in arenosis maris Caspici circa Tarki et Derbentum obvia. Floret Junio. ♃.

62. Carduus *lappaceus.* Nov.

C. (foliis sessilibus) foliis bifariam pinnatifidis spinosis supra hispidis subtus tomentosis, calycibus subsessilibus foliosis, squamis acuminatissimis inermibus reflexo-uncinatis.

Caules e radice perenni nonnulli, circiter tripedales, simplices, nudi, albo-tomentosi, sulcato-angulati; ramis apicis brevibus floriferis.

Folia sessilia, bifariam pinnatifida; segmentis alternis elongatis pectinato-patentibus, lineari-lanceolatis, apice spina alba valida munitis; quibus interjecta sunt segmenta multo minora retroflexa apice spinosa et insuper basi utrinque spina sive denticulo spinoso munitæ. *Folia superiora* minora et minus profunde secta, spinis tamen haud minus validis: omnia superne viridia pilis rigidis erectis hispida, subtus albo-tomentosa.

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† Est synonymon Scorz. creticæ *Willd. Sp. Pl.* 3. *p.* 4358.—Ed.

Flores ad caulis ramorumque apices nonnulli approximati, subglobosi, magnitudine florum Arctii Lappæ, pedunculis brevissimis foliosis insistentes; ita quidem, ut folia floralia caulinis summis similia involucri speciem referant.

Calyces glabri, virides; squamis linearibus, in acumen setaceum longum tenuissimum subinerme apice patulum deorsum arcuatum et purpurascens productis.

Flosculi purpurei colore et forma Cardui lanceolati.

Pappus plumosus.

Occurrit hinc inde in montibus altioribus. Floret Augusto. ♂.

Obs. Carduus scaber. *Poiret. Voy. en Barbarie, ii. p.* 231. nostro certe affinis est et forte idem; repugnat tamen statura gigantea 14—15 pedum.

63. Carduus *strigosus*. Nov.

C. (foliis sessilibus) foliis sinuato-pinnatifidis spinosis, lobis alternis minoribus divaricatis supra strigosis subtus glabris, calycibus ovatis glabris, spinis simplicibus patulis.

Radix biennis.

Caules plerumque nonnulli bipedales, tripedales et altiores, simplices, sulcati, glabri; ramis floriferis versus apicem haud elongatis, attamen longioribus quam antecedentis.

Folia utrinque viridia; superne et margine pilis rigidissimis quasi spinulis maxime hispida; subtus glabra, venis reticulata; cæterum sessilia, bifariam sinuato-pinnatifida; segmentis brevioribus quam antecedentis, sed in spinas haud minus validas desinentibus; alternis brevissimis retrorsum

discedentibus

discedentibus et utrinque spinula laterali munitis sicut antecedentis.

Flores antecedentis floribus majores, at Cardui lanceolati floribus minores.

Calyces ovati, glabri, virides, spinosi; spinis simplicibus patulis rectis albicantibus.

Corollæ purpureæ forma præcedentis.

Pappus plumosus.

E frequentissimis Cardui speciebus ubique in ruderatis campis et agris incultis occurrit. Floret Augusto, Septembri. ♂.

64. CARTHAMUS *cynaroides*. Nov.

C. foliis utrinque tomentosis, radicalibus pinnatifidis, caulinis oblongis adnato-decurrentibus dentato-spinosis, calycibus solitariis aphyllis, squamis apice triangularibus reflexis.

Radix simplex, descendens, biennis.

Caulis erectus, circiter pedalis, raro bipedalem altitudinem attingens, basi simplex, superne divisus in ramos 2 aut 3 unifloros, lana alba mollissima tenui vestitus.

Folia utrinque lanata sicut caulis; radicalia et caulina inferiora lyrato-pinnatifida, dentata, dentibus spinosis divaricatis; superiora oblonga non dissecta, sed tantum dentata; *caulina* omnia nervo medio cauli adnata sic decurrentia, apice soluta.

Pedunculi brevissimi, nudi, arachnoideo-villosi sicut calyces.

Calyx globosus, magnitudine Cardui Eriophori; squamis exterioribus apice triangulari reflexo carinato, spina terminali et quibusdam minutis lateralibus; squamis interioribus subulatis, membranaceis, pungentibus, erectis.

Corollulæ candidæ; tubo lineari; limbo paullo crassiore, basi monophyllo cylindrico, laciniis linearibus.

Genitalia concoloria.

Antheræ corollulas notabiliter excedentes. *Stylus* bifidus antheras vix supereminens.

Receptaculum villis longis rigidis tortis instructum.

Pappus setaceus, receptaculi villis similis, fugax.

Semina angulata, costis elevatis nigro-punctulatis; grisea punctisque minimis excavatis insculpta.

Crescit passim in ruderatis, ad vias et aggeres inter Kubam et Schamachiam. Floret Junio, Julio. ♂.

Obs. Adoptata complurium e recentioribus methodo hanc plantam ob calycinas squamas appendiculatas duplicato-spinosas ad *Carthamum* retuli. Nomen triviale analogiam imprimis florum majusculorum calycibus globosis duris præditorum, cum Cynara indicat.

65. Carthamus *glaucus*. Nov.

C. ramis subcorymbosis paucis, foliis superioribus villoso-viscidis glaucis, spinis foliaceo-marginatis, calycibus foliosis, squamis intimis lanceolatis æqualibus.

Cnicus Atractylidis folio et facie incanus patulus flore purpurascente. *Tournef. Cor. p.* 33.†

Radix annua simplex.

Caulis circiter pedalis erectus læviusculus, basi simplex; superne *ramis* paucis subunifloris, subcorymbosis, attamen haud raro quoque ipso caule altioribus.

Folia dentato-pinnatifida spinosa; *radicalia* profunde secta fere pinnata, segmentis oppositis angustis patentibus spinosis margine spinulosis, impari majore ovato-indiviso; *caulina* minus lacera, superiora imprimis floralia pube tenui subviscida glaucescentia immo in cæsium vergentia.

Flores ad apicem caulis et ramorum solitarii, oblongi, foliis supremis caulinis similibus involucrati.

Squamæ calycinæ propriæ submembranaceæ, apice scariosæ, omnes etiam intimæ lanceolatæ æquales et in mucronem inermem excurrentes.

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† Hoc synonymon in *Willd. Sp. Pl.* Carthamo dentato adjectum.—Ed.

Corollulæ purpureo-cæruleæ colore florum Serratulæ arvensis; tubo filiformi longo, fauce inflata, lineis quinque obscurioribus, laciniis filiformibus.

Antheræ corollæ concolores eademque paullo breviores.

Filamenta sub apice villosa.

Stylus simplex corollula longior. *Stigma* simplex.

Receptaculum conicum, setosum.

Semina exteriora *pappo* destituta; cæterorum pappus ex setis numerosis membranaceis lævissimis gilvis constat.

Occurrit rarius in collibus apricis, lectus in vicinia rivulorum Giljeni et Atæ. Floret Junio, Julio. ☉.

66. CARTHAMUS *lanatus.*

C. ramis subcorymbosis paucis, foliis glabriusculis viridibus, spinis foliaceo-marginatis, calycibus foliosis, squamis intimis sub apice dilatatis serrulatis.

C. *lanatus:* caule piloso superne lanato, foliis inferioribus pinnatifidis, summis amplexicaulibus dentatis. *Linn. ed. Reich.* 3. *p.* 698.

Copiosus ubique in pascuis, agris, ad vias et aggeres. Floret Junio, Julio. ☉.

OBS. Præcedenti maxime affinis, nec ulla alia nota, quam defectu pubis subviscidæ, squamarum calycinarum intimarum forma, denique corollulis ochroleucis discrepans. In Tauria quoque occurrit, ubi Carthamus glaucus cum insequenti specie exsulat.

67. CARTHAMUS *oxyacantha.* Nov.

C. ramis corymbosis pluribus, foliis glabriusculis lucidis, spinis tenuissimis coloratis, calycibus foliosis.

An Cnicus orientalis humilior flore flavo. *Tournef. Cor. p.* 33?

Radix annua, forma præcedentium.

Caulis plerumque pede brevior, basi simplex, superne in ramos floriferos numerosiores patentiores et habitiorem corymbum efficientes subdivisus, albissimus, superne villosus.

Folia minus profunde secta dentibusque minoribus quam antecedentium, apice tantum nec unquam margine spinosis; cæterum læte viridia cum nitore, et quamvis leviter pubescant nequaquam etiam summa glaucescentia. *Spinæ* crebriores, flavæ, exiles et nudæ, nec, ut antecedentium, margine foliaceo ipsum tantum apicem liberum relinquente cinctæ, sed statim ab origine e folii substantia liberæ.

Flores forma et involucro præcedentium.

Flosculi pauciores, toti saturatius lutei, lineis nullis picti; limbo æquali basi non campanulato ut in præcedentibus, sed ad ipsum tubum usque fisso, laciniis linearibus.

Genitalia corollulis concoloria.

Lectus inter segetes in vicinia rivulorum Atæ et Giljeni nec alibi. Floret Junio. ⊙.

Obs. Hæc quoque species plurimis notis cum præcedentibus convenit, facilius tamen ab his distinguitur, quam hæ inter sese invicem. Caracteres diagnosticos majoris momenti ipsa speciei definitio exhibet.

68. Carlina *Echinus.* Nov.

C. foliis spinosis sinuatis dentatis subtus tomentosis, calycinis squamis ciliatis flosculis brevioribus, exterioribus spinosis patulis, interioribus subulatis reflexis.

Radix biennis?

Caulis sesquipedalis aut bipedalis, erectus, superne ramosus, sulcato-angulatus mediante nervo medio foliorum decurrente, subtomentosus.

Folia semiamplexicaulia, oblonga, sinuata; lobis dentatis, dentibus divaricatis, apice spina tenui longa et margine spinulis nonnullis parvis armatis; supra leviter pubescentia, subtus tomento tenui canescentia; *suprema* minora, spinis crebris bifariam patentibus longissimis instructa.

Flores in ramis ramulisque terminales, subsessiles solitarii, nutantes, circiter Jaceæ magnitudine.

Calyx subglobosus, imbricatus; squamis oblongis, exterioribus in spinam longam basi ciliatam albidam patulam desinentibus, interioribus membranaceis, angustis, subulatis, ciliatis, vix pungentibus, recurvis.

Flosculi omnes æquales hermaphroditi sulphurei; tubo filiformi tenui, limbo erecto, laciniis filiformibus.

Genitalia concoloria, vix corollularum longitudine. *Stylus* apice vix fissus.

Receptaculum piloso-paleaceum, nempe pilis basi in membranulam brevissimam connatis.

Semina albida, lævia, forma seminum Cardui; pappo plumoso fere flosculorum longitudine.

Hinc inde obvia in lapidosis siccis, imprimis ad rivorum margines in tractu montium inter Kubam et Schamachiam. Floret Julio. ♂.

Obs. Planta hæc (æque ac species affines, Carlina atractyloides Linn. et Carl. gorterioides Lamarckii) ægre ad hoc genus refertur; a Carduo quoque et a Carthamo aliena.

69. Gnaphalium *candidissimum*. Nov.

G. sublignescens niveo-tomentosum, foliis elliptico-lanceolatis succulentis, corymbo composito, calycibus ovatis pubescentibus.

Elichrysum orientali simile, calyce florum argenteo. *Tournef. Cor. p.* 33?

Caules e basi lignescente plures, dodrantales aut breviores, declinati, simplices, florum corymbo terminati, tomento candidissimo denso ceu epidermide obducti æque ac pedunculi et folia.

Folia sparsa, elliptico-lanceolata, brevia, obtusiuscula, integerrima, succulenta; *superiora* minus conferta sensimque minora et angustiora.

Flores in corymbos densos multifloros dispositi, ovati, Gnaphalii arenarii floribus duplo majores.

Calycinæ squamæ imbricatæ, obtusæ; exteriores breviores in medio tomento tenui albo vestitæ margine dilutissime fuscescentes; interiores longiores albo-membranaceæ, linea dorsali apicem non attingente viridi.

Flosculi omnes æquales hermaphroditi; limbo 5-fido luteo.

Antheræ luteæ, corollulas vix supereminentes.

Styli in florente vix staminum longitudine.

Receptaculum nudum.

Semina minutissima, *pappo* piloso multiseto fere longitudine flosculorum.

Commune ad margines lapidosos rivulorum imprimis rivi Pirsagat in vicinia Veteris Schamachiæ. Floret Julio, Augusto. ♄. ♃.

Obs. Videtur Gnaphaliio orientali non diffine, foliis brevibus elliptico-lanceolatis succulentis et tomento denso candidissimo distinguendum.

70. Anthemis *fruticulosa*. Nov.

A. suffruticosa diffusa incana, ramis adscendentibus superne nudis unifloris, foliolis linearibus carnosis, petalis ovatis.

Anthemis fruticosa, foliolis linearibus carnosis, pedunculis longioribus nudis erectis unifloris. *Gerard Prov. p.* 209. *tab.* 8.

Chamæmelum montanum incanum absynthioides. *Barrel. Ic.* 451.

Radix multiceps, fibris longissimis.

Caulis basi fruticulosus diffusus, emittens fasciculos foliorum et *ramos* floriferos erectos, spithamæos simplices, superne nudos unifloros, villis incumbentibus albis pubescentes sicut tota planta.

Folia petiolata, pinnato-composita; pinnulis alternis oblongis brevibus carnosis, apice mucrone minimo.

Pedunculi minus quam caules canescentes, subtilissime striati.

Flores magnitudine Cotulæ.

Calyx hemisphæricus albo-villosus; *squamis* ovatis margine tenuissime membranaceis, apice appendiculo scarioso lacero dilute-fuscescente; interiorum magno dilatato.

Corollulæ radii albæ, latæ et breves, apice crenulis 3 aut 4, tubo carnoso compresso.

Corollulæ disci 5-fidæ, luteæ, tubo carnoso.

Stamina radii filamenta 5 antheris carentia.

Stamina disci fertilia, vix corollulis longiora.

Stylus bifidus; radii vix tubum corollulæ supereminens; disci fere corollulæ longitudine.

Receptaculum hemisphæricum, paleaceum; *paleis* membranaceis, linea media viridi in acumen elongata, fere longitudine tubi corollularum.

Semina nuda, angulata, pappo destituta.

Copiosa in abruptis sterilissimis circa Kurt-Bulak. Floret Junio. ♄.

Obs. Anthemidi alpinæ Linn. affinis, sed præter alias notas caulibus suffruticosis ramosis diffusis discrepans.

71. Achillea *Eupatorium*. Nov.

A. villosa, foliis pinnatis, pinnulis plano-patentibus, inciso-serratis, basi latiore decurrentibus, corymbis convexis amplissimis, floribus radio destitutis.

Ptarmica orientalis foliis Tanaceti incanis flore aureo. *Buxb. C.* 2. *p.* 25. *tab.* 19.

Ptarmica orientalis incana, foliis pinnatis, semiflosculis florum vix conspicuis. *Tournef. Cor. p.* 38.†

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† Synonymon hoc excludendum erit sec. *Willd. Sp. Pl.* 3. *p.* 2205.—Ed.

Radix perennis.

Caules sæpe nonnulli, erecti, pedales, simplices, sulcati, villosi et subcanescentes sicut tota planta neque vero albo-tomentosi.

Folia pinnato-composita, lata, plana, sessilia; *foliolis* oblongis, acutiusculis, inciso-serratis, basi latioribus et postice ad petiolum communem decurrentibus adeoque confluentibus.

Corymbus terminalis amplissimus, convexus, densus, e floribus numerosissimis constans.

Flores oblongi, magnitudine Ach. Millefolii.

Calyx villosus; squamis oblongis, quibusdam ad basin brevioribus.

Radius nullus, sed *flosculi* omnes tubulosi, circiter deni, lutei, genitalibus concoloribus.

Receptaculum paleaceum; *paleis* oblongis albo-membranaceis, nervo medio viridi; ætate elongandum in rachis speciem, cui flosculi cum paleis adhærent.

Semina formæ communis in hoc genere, minutissima, pappo carentia.

Odor fortis generi Achilleæ peculiaris.

Communis ad vias et sylvarum margines, per totam regionem circa Derbentum, Baku, Kubam, Schamachiam utramque. Floret Junio. ♃.

Obs. Synonymon Buxbaumii certe huc pertinet, quod locus quoque natalis ab eo citatus testatur. Cæterum species nostra proxima videtur Achilleæ filipendulinæ Lamarckii; conf. ej. *Dict. Enc. Bot.* 1. *p.* 27. *n.* 12.

72. Juniperus *excelsa*. Nov.

J. caule arboreo validissimo, adultæ foliis minimis oppositis quadrifariam imbricatis, tenellæ acerosis patulis ternis, baccis nigris.

Cedrus orientalis fœtidissima arbor excelsa; seu Sabina orientalis fructu parvo nigro. *Tournef. Cor. p.* 41.

Juniperus Sabina var. Taurica. *Pallas Ross.* 2. *p.* 15.

Juniperus hispanica: foliis quadrifariam imbricatis acutis. *Mill. Dict. n.* 13?

Communis in montium altiorum lapidosis aridis. ♄.

Obs. Differt a Junipero Sabina cui proxima proceritate et mole trunci. Folia adultioris vix a Sabinæ foliis distinguenda; at tenella folia gerit plane absimilia, scilicet acerosa, pungentia, patula, terna, Juniperi communis foliis analoga. Descriptionem in Flora Taurica dabimus.

73. Saccharum *Ravennæ.* Linn.

S. panicula elongata contracta, juniore spiciformi, pedunculorum calycumque lana longissima flosculos submuticos abscondente.

Radix repens, amplum, sæpe cespitem foliorum culmorumque promens.

Culmi sesquipedales, bipedales, immo quandoque quadripedales, teretes, superne nudiusculi.

Folia lata, arundinacea, acuminata, læte viridia, vaginis ore pilosis.

Panicula terminalis elongata, contracta; junior immo dum floret spiciformis et Alopecuro analoga; ætate patentior.

Paniculæ rami alterni, imbricati, subdivisi, lana candida longissima et molli vestiti; quæ lana

Spiculas parvas, lineares, alternas, approximitas breviter pedicellatas abscondit.

Flosculi plerique feminei; masculi rari.

Calyx gluma uniflora bivalvis; valvulis oblongis membranaceis albis, dorso spadiceis subæqualibus muticis, totis lana eadem qua paniculæ rami pedicellique obsitis.

Corolla univalvis; valvula minima albo-membranacea, submutica, calyce involuta.

Stamina spicularum mascularum tria. *Antheræ* flavæ admodum fugaces.

Germen spicularum fœminearum oblongum ; *styli* duo, calyce duplo longiores, plumosi, purpurei.

Occurrit in planitie versus torrentes Kessartschai et Samur inter Kubam et Derbentum. Floret Junio. ♃.

71. MIMOSA *Stephaniana.* Nov.

M. (aculeata, foliis bipinnatis) pubescens, foliolis ovato-oblongis basi inæqualibus, spicis simplicibus elongatis, staminibus vix corolla longioribus.

Senna Persica spinosa, foliis exiguis. *Buxb. C.* 3. *p.* 36. *tab.* 48. *mala.*

Siliqua Nabathæa ex Persia allata. *Breyn. Exot. Cent.* 1. *tab.* 55. legumen optime.

Radix lignosa, crassitie digiti, extus atro-purpurea, intus albida, longissime in terram defixa.

Caulis fruticosus, erectus, pedalis aut bipedalis, raro altior, crassitie pennæ anserinæ, aculeatus aculeis sparsis rectis basi dilatatis, pube subtili glaucescens.

Rami elongati, graciles, alterni, adscendentes flexuosi, aculeati et pubescentes sicut caulis, præsertim juniores.

Stipulæ solitariæ, caducæ ; inferiores subreniformes, obsolete denticulatæ ; superiores minores scilicet vix foliola magnitudine superantes, integræ, oblongæ, acutæ.

Folia abrupte bipinnata, circumscriptione ovata, breviter petiolata, pubescentia sicut caulis ; pinnis oppositis conjugationibus sæpe quinis ; petiolo communi in mucronem muticum brevissimum excurrente.

Foliola subtredecemjuga, stricte opposita, ima et superiora paullo minora ; omnia parva, oblonga, acutiuscula, obliqua et fere semicordata ob basin exteriorem folioli productam nervumque principalem a basi ad apicem non per folioli medium sed margini antico propius excurrentem. Juxta nervum principalem alter ex ipsa basi marginem interiorem versus exit, qui vero folioli apicem haud attingit.

Racemi axillares simplicissimi, solitarii, folio longiores breviter pedunculati.

Flores circiter magnitudine florum Veronicæ, pallide lutescentes, brevissimis tenuissimisque pedicellis insistentes, sparsi, bracteis vix ullis.

Calyx minimus, denticulis quinque.

Corolla regularis, pentapetala; *petalis* oblongis acutiusculis, parum patentibus.

Stamina 10 receptaculo inserta, corolla paullo longiora. *Filamenta* subulata, basi vix connexa, æqualia. *Antheræ* incumbentes flavæ.

Pistillum unicum staminibus paullo longius; *germine* oblongo; *stylo* columnari; *stigmate* simplice, torto.

Legumen oblongum, circiter sesquiunciale, curvum, obtusum, farctum, purpurascens, multiloculare, scilicet duplici seminum ordine intra materiam suberosam; singulis dissepimento transversali separatis.

Semina formæ communis in hoc genere, magna, compressa, subrotunda, lævissima, pallide fusca.

Flores mere masculos nullos vidi; attamen plurimi e floribus abortiunt, ita ut raro legumina tria quatuorve in eadem spica matura semina ferant. Folia autumno decidunt in specie hac frigorum magis quam congeneres omnes patiente.

Frequens in siccis provinciæ Schirvan, imprimis per planitiem ad Cyrum fluvium, circa Novam Schamachiam et in vicinia fluminis. In desertis ad dextrum latus Cyri, Araxem versus, integras plagas ferme sola occupat. Floret Julio. ♄.

Dicta in honorem D. Friderici Stephani, Professoris Mosquensis.

Absolutis stirpibus novis vel minus cognitis, nonullarum, quarum hactenus mentionem haud feci, nomina subnecto.

Ziziphora capitata.
Salvia viridis.
—— verbenaca.
—— verticillata.
—— sylvestris.
—— Æthiopis.
—— Sclarea.
Iris pumila.
— ochroleuca.
Saccharum Ravennæ.
Phalaris bulbosa.
Panicum dactylon.
Crypsis phleoides (Phleum schœnoides *Linn.*)
—— schœnoides (Schœnus aculeatus *Linn.*)
Alopecurus monspeliensis.
Milium paradoxum.
Agrostis bromoides.
Melica ciliata.
Poa salina.
Briza virens.
Cynosurus echinatus.
Stipa pennata.
Avena fatua.
Arundo Donax.
—— Phragmitis.
—— Calamagrostis.
—— epigejos.
Triticum junceum.
Triticum prostratum.
Dipsacus laciniatus.
Scabiosa transylvanica.
—— leucantha.
Knautia plumosa.
Galium rubioides.
—— parisiense.
Plantago Psyllium.
—— Lœflingii.
Camphorosma monspeliensis
Anchusa italica.
Asperugo procumbens.
Echium rubrum.
Messerschmidia Arguzia.
Androsace maxima.
Convolvulus lineatus.
—— Cantabrica.
—— Persica.
Verbascum phlomoides.
Cynanchum acutum.
Apocynum venetum.
Chenopodium Botrys.
Beta maritima.
Velezia rigida.
Tordylium maximum.
Caucalis orientalis.
Daucus Visnaga.
Ferula nodiflora.
Laserpitium aquilegifolium.
—— ferulaceum.

Laserpitium prutenicum.
Statice coriaria *Pall.*
——— fruticulosa.
Linum austriacum.
——— flavum.
——— gallicum.
Allium sphærocephalum.
——— descendens.
——— moschatum.
——— flavum.
Ornithogalum narbonense.
Bulbocodium vernum.
Atraphaxis spinosa.
Rumex ægyptiacus.
——— Nemolapatho *Ehrh.* affinis.
Epilobium rosmarinifolium.
Stellera Passerina.
Zygophyllum Fabago.
Gypsophila paniculata.
——— muralis.
——— glomeratæ *Pall.* affinis.
Dianthus prolifer.
——— deltoides?
——— Carthusianorum.
Cucubalus italicus.
——— mollissimus.
Silene conoidea.
——— chloræfolia *Smith.*
Arenaria fasciculata *Jacq.*
——— striata *Allionii.*
Garidella Nigellastrum.
Peganum Harmala.

Euphorbia saxatilis.
——— gerardiana *Jacq.*
Potentilla supina.
——— recta.
Chelidonium corniculatum.
Cistus Fumana.
——— ægyptiacus.
——— Helianthemum *Lamarckii.*
——— niloticus.
Nigella orientalis.
Clematis orientalis.
Thalictrum minus.
Teucrium hircanicum.
——— Polium.
Nepeta ucrainica.
Sideritis montana.
Stachys lanata.
——— recta.
Marrubium peregrinum.
Phlomis laciniata.
——— Herba Venti.
——— tuberosa.
Thymus vulgaris.
——— Zygis.
——— Acinos.
Scutellaria orientalis.
Prunella laciniata.
Rhinanthus Trixago.
Lathræa Phelypæa.
Pedicularis tuberosa.
Dodartia orientalis.
Myagrum rugosum.
Anastatica syriaca.

Lepidium latifolium.
——— vesicarium.
Turritis hirsuta.
Geranium ciconium.
Althæa hirsuta.
Ononis minutissima.
Lathyrus sphæricus *Retz?*
——— hirsutus.
——— pisiformis.
Vicia narbonensis.
Coronilla Securidaca.
Hippocrepis unisiliqua.
Hedysarum buxbaumianum *Pall.*
——— grandiflorum.
——— Alhagi.
——— cornutum.
Phaca salsula *Pall.*
Astragalus austriacus.
——— exscapus, var. β.
——— trimestris.
Trifolium lappaceum.
——— angustifolium.
——— fragiferum.
Lotus Dorycnium.
Hypericum Coris.
Tragopogon major *Jacq.*
——— undulatus. —
Scorzonera hispida *Forsk.*
——— dichotoma *Vahlii.*
Picris echioides.
Chondrilla juncea.
Crepis neglecta.
Hyoseris Hedypnois.
Serratula amara.
——— centauroides.
Carduus polyanthemus.
——— ciliatus.
——— marianus.
——— hispanicus *Lamarck.*
——— mollis *Jacq.*
Carthamus Acarna *Lamarck.* (Cnicus *Linn.*).
Chrysocoma villosa.
——— Linosyris.
Artemisia pauciflora.
——— humilis.
——— rupestris.
——— piperita *Pall.*
Gnaphalium arenarium.
——— orientale.
Xeranthemum annuum.
Conyza squarrosa.
Erigeron acre.
——— canadense.
Senecio erucifolius.
Cineraria longifolia?
Inula Oculus Christi.
——— germanica.
Aster Amellus.
Chrysanthemum inodorum.
——— alpinum.
Achillea tomentosa.
Buphthalmum spinosum.
Centaurea Crupina.
——— acuta *Vahlii.*
——— sibirica.

Centaurea splendens.
——— amara.
——— solstitialis.
——— reflexa.
Echinops strigosus.
Serapias latifolia.

Andropogon Ischæmum.
Ægilops squarrosa.
——— triuncialis.
Atriplex hortensis, var.
——— laciniata.

XXIX. *Historical Account of* Jos. DOMBEY, *translated from the French of* M. DELEUZE[*].

THE names of literary men who acquire a reputation by their writings, descend to posterity, together with their discoveries; and should their contemporaries deny them justice, or envy seek to obscure their deserts, still their works remain a durable monument, and will at last establish their proper rank in literature. The history of the lives of such, though useful to point out the steps by which they advanced to knowledge, and to diffuse more widely the general results of their labours, is not necessary to their fame.

Far differently circumstanced are men who, unseduced by the comparatively easy mode of acquiring knowledge in their closets, sacrifice their time, their fortune, and their health, to seek, in unknown climes, the materials necessary to establish on a solid base the theories of ingenious men. For these travellers, whilst they enrich our museums with the different productions of the globe, whilst they increase our knowledge in geography, and point out new sources of commerce and new excitements to industry, too frequently fall victims to their zeal, before they have completed their enterprises, and have no opportunity of publishing an account of their labours and their discoveries.

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[*] Annales du Muséum National d'Histoire Naturelle, tom. iv. p. 136.

They have a claim to our acknowledgments; yet their names would sink into oblivion, unless some one could be found willing to pay them the tribute of writing their merited eulogy. It becomes then a duty in us to pay that respect to their memory, which we in vain regret they cannot now enjoy.

Prompted by these considerations, the professors of the museum are anxious to record, in their annals, the services which Joseph Dombey has rendered to natural history in general, and to this establishment in particular; and I esteem myself happy that this task has fallen to my lot. A celebrated name, prefixed to a biographical memoir, is alone sufficient to excite curiosity, and should I succeed in drawing a faithful picture of the character and labours of the subject of this, it cannot fail to be read with a lively interest, and the name of Dombey will become dear to the friends of science and of humanity.

Joseph Dombey was born at Macon on the 22d of February 1742. We have not been anxious to collect anecdotes of his youth; suffice it to say, that he took the degree of doctor of physic at Montpellier; in which city he first acquired a passion for natural history, and more especially botany, which he studied under M. Gouan. In stature he was tall and well made. His constitution was strong. His character naturally full of vivacity and gaiety, and thoughtless of either fortune or fame, he devoted himself with equal ardour to study and to pleasure. Enemy to all constraint, and considering his patrimony as sufficient for his demands, he was totally negligent of his affairs. Amiable and generous, he mingled with society without calculating the expense or loss of time. The morrow with him was ever a distant period.

Seemingly occupied during winter solely with the pleasures of the town, as soon as spring reanimated vegetation, he was attracted to the country by the flowers; in search of these he travelled through the southern provinces, and along the sea coasts, and when they were no longer to be found in the plains, he ascended the mountains, and staid there till driven away by the snow. For several months no one heard speak of him, nor was it known where he could be found. As long as his money lasted, he used it to facilitate his journeys; but when it was gone he knew how to do without it, travelling on foot, and living with the frugality of a hermit, till an opportunity offered of borrowing more; when, reckoning that he should soon have wherewithal to repay, he would, without hesitation, give exorbitant interest. Continuing thus to spend without calculation, when the time of payment came he found himself harassed by his debts, and again had recourse to ruinous expedients for raising money. To this thoughtlessness he joined a most delicate sense of honour: his word was a sacred engagement. Unsuspicious and disinterested, his commerce with the world was easy and mild; but to this mildness was joined a firmness, a bravery, and even a sort of pride suitable to a man who knew how to respect himself.

With a view to his proficiency in botany he removed to Paris in 1772, and on his arrival there presented to M. Bernard de Jussieu a very fine herbarium of the Pyrenees. He attended the lectures of this professor, as well as those of M. Lemonnier, and attached himself particularly to M. Thouin, all of whom entertained the highest idea of his talents and integrity. J. J. Rousseau, weary of a fame so fatal to his repose, was at this time seeking to console himself with the study of botany. This philosopher, meeting by accident with Dombey, was so much pleased with his frankness, and especially with his talking to him about nothing but plants, that he was desirous of having him for a companion in his botanical excursions, and conceived for him an intimate friendship.

In 1775, Jussieu being applied to by the controller-general, M. Turgot, for a botanist to go to Peru, in order to search for such useful plants as might be naturalized in Europe, recommended Dombey, as every way fit for the undertaking, and the minister desired to see him; but being at that time ranging over the alps, on his return from a journey to Berne, where he had been to pay a visit to the great Haller, he was not immediately to be found. M. Thouin addressed several letters to him, at different places; and the one directed to St. Claude finding him there on the 13th of August 1775, he set off immediately for Paris, presented himself to M. Turgot, and received orders to hold himself in readiness to depart for Madrid, from whence he was to proceed to Peru. He immediately procured whatever he thought necessary, settled with his creditors, to whom he secured a part of the salary of 3000 livres allotted him, and was extremely impatient to be gone; but as the necessity for making the project agreeable to the court of Spain occasioned a delay till the autumn of the following year, this time he employed in making himself acquainted with every branch of natural history, and more particularly with whatever related to the objects of his voyage.

He arrived at Madrid on the 5th of November 1776, where he found the phlegmatic character of the persons with whom he had to deal, entirely opposite to his own, their indolence ill-suited to his impatience, and their want of confidence altogether intolerable. The minister for the Indies, M. de Galvez, wishing to join with him some Spanish botanists to collect for Spain, as he should do for France, two pupils of M. Ortega and two draftsmen were appointed for this purpose, with a salary of 10,000 livres each. Instructions were drawn up, by which even Dombey's pursuits were to be regulated; for he was charged to make experiments upon the culture of cinnamon, supposed at that time to be indigenous in Peru, and to apply himself to several researches concerning the mines. On account of the delay occasioned by this arrangement, the expedition was not ready to sail for ten months longer: yet in spite of all the solicitations of Dombey, many necessaries were neglected to be procured, and he was obliged to furnish at his own expense paper, instruments, &c. These and other articles cost him three times as much as they would have done at Paris; and although he lived with great economy, he found his income inadequate to his expenses at Madrid. His salary was doubled, but still fell much below that of his companions. This was a subject of uneasiness; but having arrived at Cadiz on the 17th of September 1776, all the difficulties and dangers of the voyage vanished from his sight: his thoughts hurried him across the Atlantic, and he already enjoyed, in prospect, the pleasure of seeing the plants of the new world, and of making himself useful to his country and to Spain. He embarked on board the Peruano of sixty guns, commanded by M. de Cordua, on the 20th of October 1777, and arrived at the port of Callao on the 7th of April 1778. The next day he went to Lima, where he was very well received by don Emanuel de Guirrior, the viceroy of Peru.

At the sight of the antient kingdom of the incas, his enthusiasm redoubled; he contemplated at a distance the summits of the Cordilleras: he was however detained several months at Lima. In this city it never rains, but, in the winter season, a continual fog obscures the sun and nourishes vegetation, and by the end of the spring all is dry and scorched up. Dombey employed this time in collecting seeds, not from off the plants, but from the repositories of the ants in the sand, where the want of moisture preserved them from germinating.

M. de Bordenave, canon of Lima, an old friend of M. J. Jussieu, pressed him to accept of board and lodging at his house; but this, although a great resource in a country where every thing is so dear, he refused rather than separate himself from his companions, with whom, in the spring, he undertook a journey along the coasts, as far as the line, near to Quito. The travellers were exposed to great danger, from which they escaped only by their courage, being attacked by a band of runaway negroes, of whom they killed one, and took three prisoners. No notice was taken of this event at Lima.

Dombey procured in this journey a great many plants, and other objects of curiosity, and some extremely rare antiquities, such as the vases found in the tombs of the antient Peruvians, and a dress of the incas. He superintended the making of 300 drawings, many of them of new genera, but he could not obtain a copy even of the representations of the plants he had named in honour of his patrons and friends. It was not upon this occasion only that he felt the art of design to be one of the most essential requisites to a naturalist, particularly to a traveller.

On his return to Lima, Dombey, learning that the Buen-Consejo was about to sail for Cadiz, wished to seize this opportunity of sending his collection to Europe. The number of his specimens was very considerable, having preserved twelve of each species. Of these he made two herbariums; one for France, and the other for the king of Spain. He sent also the vases and the antient dress, which he begged M. d'Angivillers to present to the king of France; several specimens of minerals, and thirty-eight pounds of platina, designed for the cabinets of the king, the academy, and M. Sage; a packet of seeds of the Quinoa*, &c. He also addressed to M. de Galvez a memoir on the pretended cinnamon tree of the neighbourhood of Quito, which he proved to be not the true cinnamon of Ceylon, but another species of Laurus (*Laurus quixos* Lam. Encyc.), not applicable to the same purposes, and therefore not worth attempting to cultivate; and a memoir upon a cruel disease very common in Peru, which he attributes to the abuse there made of pepper (*Capsicum annuum*), of the pubescent winter-cherry (*Physalis pubescens*), and of the love-apple (*Solanum Lycopersicum*).

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* *Chenopodium Quinoa* L. This plant is cultivated in Peru and Chili; the leaves are eaten like spinach; and the seeds, which Dombey assures us are nearly as good as rice, form the principal nourishment of the people. It is an annual, and would therefore succeed in France; but unfortunately the seeds sent to M. Thouin could not be sown till two years after they were gathered, and consequently would not grow.

In April 1779 he received an order from the viceroy to repair to Ceuchin, to analyse the mineral waters. After having fulfilled this commission, at his own expense, he advanced into the province of Tarma, on the other side the Cordilleras, and followed the torrents which run into the Maragnon, or River of the Amazons. In this canton the country is mountainous, and the soil so variable, that every valley produces a different set of plants: but the precipices, the height of the mountains, and the sudden changes from heat to cold, render botanizing both troublesome and dangerous. He next proceeded to Huanuco, where he arrived in the beginning of May 1780. This town is the last of the Spanish settlements. Further on are vast forests, where the Cinchona grows in abundance, though not known before to be found any where but in Loxa. The Spaniards had indeed been informed of this the year before; but it was very important to verify the fact, and to determine whether the species were the same as the officinal bark. Mules, servants, Indian guides, and provisions, the same as for a voyage by sea, were requisite to botanize in these forests, so impenetrable from the trees being tied together by several kinds of climbing plants, that a passage can only be made with the hatchet. For every species a tree must be felled, often two, because most of them are dioicous. In these thick forests the heat is so suffocating, for want of the circulation of air, as to occasion the greatest inconvenience; speedily spoiling the salted provisions, and filling the biscuit full of insects. The travellers had established the depôt of their collection at the little post of Cochero, where nothing was to be procured: nevertheless, they would have prolonged their stay, had they not received information that two hundred savages were on their way to attack and pillage them; to escape from whom it was necessary to set out in the middle of the night, to cross over the precipices, in order to reach Huanuco, from whence Dombey returned to Lima to procure assistance. The two servants he had been obliged to take with him cost him more than his salary, and he laid out in articles he had purchased more money than had been given him; and although M. Necker had ordered him 10,000 livres extra pay, this whole sum was absorbed in the expense of package only. His companions had a salary of 10,000 livres each, yet he had been obliged to lend them 8000. It may be asked whence he could obtain these resources:—let us see how this enigma is to be solved.

I have already said that Dombey carried to Lima the produce of his botanical excursions. Here he occupied himself in writing the descriptions, of which he always made duplicates at least; in arranging his specimens, and in collecting every thing curious or interesting: yet all these objects, to which he devoted himself with such ardour, did not employ the whole of his time. He and his companions were at first well received; but in a country where luxury is excessive, where riches only are held in estimation, and the sciences so very little known, men who travelled on foot to collect herbs were soon held in derision and contempt. Some few only, to whom they had letters of recommendation, treated them with respect. There existed a still more unfavourable prejudice against Dombey; for the writings of the French philosophers and literati having scandalized the Spanish clergy, every Frenchman passed for a heretic. "I am very regular in conforming to all religious customs," says he, in one of his letters; "but notwithstanding this, the Inquisition would not let me alone a single day, if I had not been sent by the king." He conducted himself, however, so prudently, that he soon conciliated both esteem and consideration. He was a physician, and visited the sick; and the prejudices against him did not prevent his being regarded as more skilful than the physicians of the country. He visited alike the rich and the poor, without ever accepting of any fee: he distributed medicines to the poor gratis, and frequently gave them money also. If he worked all the day, at night he went into company, always avoiding going to the same houses as his companions.

The Peruvian ladies are very agreeable, addicted to pleasure, but badly educated. Dombey did not seek their society in private, but paid his court to them in their public assemblies. Play is their principal occupation, and to make one of their party is the best way to be well received. As they attach but little value to money, they of course play carelessly. Dombey, whilst he gave up his time to their amusement, played at cards in a gentleman-like disinterested manner, but with attention: he was successful; and it is singular enough, that a passion so often ruinous, and almost always an enemy to study, was to him an useful resource, and even enabled him to procure objects in natural history. Thus, by conforming to the customs of the country, and distinguishing himself by a respectful gallantry towards the ladies, Dombey was soon in high repute. The frivolous found in him one of the most amiable of men; to those who knew how to appreciate merit, he recommended himself by his manners and his knowledge; in fine, by his easy address, his open character, and the services he rendered, he made himself friends, who offered him money whenever he stood in need of it, and would not be repaid till after his return to France. One of these lent him at one time 40,000 livres. At the same time he was no economist: when he gained he paid his debts, he made new acquisitions, and the surplus, if any, he gave to the unfortunate. Thus it was that at one time he was seen living in splendour, then again not able to keep one servant; but labouring with the same zeal in every situation.

If the Spanish government is justly accused of being often suspicious; if the people are a prey to indolence, and debased by superstition, there are in this nation, perhaps more than in any other, instances of men possessing elevated and generous souls, animated by every character of greatness, and who disregard every sacrifice they can make: there are among them enlightened men, who set the higher value upon knowledge, and are the more sensible of the advantages arising therefrom, in proportion as it is of more rare occurrence. In this class Dombey found admirers and friends, who thought themselves happy to offer him services, opening to him their purses, and cooperating with him in doing good; and we shall soon see that many parts of his conduct might well excite their enthusiasm.

Having procured the necessary funds, and packed up his collection, Dombey wished to return to Huanuco, where he had left his companions; a journey at this time full of danger, all the provinces about Lima being in a flame. The Indian Tapac-maro, pretending to be a descendant of the incas, had put himself at the head of a considerable party, and drawn a number of villages into his rebellion. This war had already occasioned the destruction of several thousand lives; and the loss of the whole of Peru was dreaded. Notwithstanding this alarming state of affairs, Dombey continued his pursuits, and arriving at Huanuco the latter end of December 1780, he found the inhabitants plunged in the greatest distress and consternation, and reduced to extremities, having neither food nor money. He immediately waited on the president of the general council, and offered him the sum of 1000 piastres, and twenty loads of corn, for the support of the troops. The council and all the military officers assembled; when Dombey, renewing his offer, added that of raising two regiments at his own expense, putting himself at the head of them, and marching against the rebels. He was heard with enthusiasm; and although his offer was not accepted, the Spanish officers were roused by the liberality of a Frenchman, and engaged to furnish the thousand piastres, and to maintain the troops at their own expense, each in his turn. Thanks were voted to Dombey by the council, by the officers, the magistrates, and the bishop; they acknowledged that to him they owed the preservation of the city, and perhaps the termination of the war; in which perished, before the capture of Tapac-Maro, a hundred thousand persons. Dombey, however, resolved not to profit by the refusal of his gift, sent it to the hospital of St. Jean-de-Dieu, to be distributed amongst the poor *. On his departure from Huanuco he was accompanied by the blessings of the inhabitants; but unfortunately the glory with which he was covered could not fail to excite envy.

On his return to Lima he received the most afflicting intelligence. The ship Buen-Consejo had been taken by the English. All the collections had been repurchased at Lisbon, on account of the Spanish government, and M. Ortega had presented to his Catholic majesty the vases, the dress of the incas, and other valuable articles intended for the king of France. Nothing had been forwarded to

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* I have now before me the *procès verbaux*, the certificates, the thanks, ministerial letters, and other papers, relative to this transaction, and regret that the limits of this memoir will not allow of my transcribing part of them, to show the importance of the services rendered by Dombey, and the energy with which the magistrates, the Spanish officers, &c. express their admiration of and gratitude to him.

Paris but the duplicates of the dried plants and seeds. As the vessel had been taken by the English, and the property bought by Spain, the king of France had certainly no valid claim upon it; yet a proceeding so opposite to the elevated sentiments of Dombey could not fail to wound his feelings. He did not however show any discontent; but when those who had profited by his labours dared to add reproaches, he repelled them with indignant firmness. "The minister for the Indies," said the viceroy to him, "has desired me to inform you that the king of Spain thought it strange that the herbarium designed for him was not so considerable as that for the king of France."—"And has not the French minister also written to your Excellency to complain that my Spanish companions have not transmitted to Paris copies of their drawings, and duplicates of what they have collected?"—"No, certainly; but the Spanish gentlemen do not owe any thing to France."—"And what, sir, do I owe to Spain? Does the king of Spain pay me any salary? You may answer, that since it is demanded of me, I will never from this time send any thing more." The viceroy, who possessed as much gentleness as dignity, far from resenting this pride, endeavoured to sooth him, and persuaded him to write civilly to the minister for the Indies; and Dombey, though he resisted unjust commands, instantly yielded to these polite solicitations, and continued to send to Spain duplicates of each plant, only taking the precaution to demand receipts, that he might have it in his power to produce to his court the proof of his proceedings.

Exhausted with fatigue, our traveller was now desirous of returning to Europe, but he wished first to visit Chili; a country the more interesting to him, because the climate, being very similar to that of France, afforded hopes that its vegetable productions might be more easily naturalized. Having filled twenty cases with his collections, and deposited

sited them at Lima, with directions to have them embarked after the peace, he prepared to set off for Chili, a journey requiring enormous expenses, as he could not dispense with his two servants, whom he had instructed, and who required great wages. Money was necessary, as well to defray the expense of his journey and his residence in the country, as for the purchase of the curiosities he might meet with; and such was the zeal he had inspired, that 50,000 livres were offered him. He also had letters of recommendation to the most distinguished characters, and arrived at Conception in the beginning of the year 1782.

In this city a contagious disease was at that time making dreadful ravages; many had perished; every one shut himself up in his house; and the sick were abandoned. Dombey was advised to avoid the danger. What indeed had a botanist to fear, whose employment was to ramble over the country, and in a climate so mild that it was easy to avoid every suspected house? But Dombey was not only a botanist, he was likewise a physician, and his humanity prompted him to brave every danger. He accordingly settled in the city, and, excluding himself from every house where the contagion had not reached, dedicated his whole time to visiting the poor, furnishing them with food, medicines, vinegar, sugar, beds, and even nurses at 5 livres a day. He soon found that the distemper was not so fatal when treated properly, and he devoted himself with indefatigable courage. When it was observed that he cured others without being infected himself, confidence returned, the sick were taken better care of, and in the end the epidemic totally disappeared. Dombey was now regarded as a messenger from heaven, he received thanks in the name of the whole country, and was offered the place of physician to the city, with a salary of 10,000 livres. Nor were other means neglected to detain him; for Dombey having regarded with much interest a beautiful young lady, and very rich, who was herself not insensible to his merit, the bishop of La Conception insisted upon her marrying him. Although more inclined to the match from the feelings of his heart than even from the prospect of riches and reputation, yet reflecting that this marriage would prevent his returning to his own country, and offering there the fruits of his labours, he resisted the temptation, and to avoid the struggle left La Conception and repaired to St. Jago. This determination he was sensible he might live to regret; but he considered it as a duty to fulfil the mission intrusted to him. Would to God he had yielded to these solicitations of gratitude! Perhaps he had then been still living; he might have sent his collections from Chili to Europe, and had been spared the pain of seeing himself deprived of the greater part of the fruits of his labour; had escaped being a prey to the vexations which embittered his latter days, and nearly deprived him of his reason; nor would he then have witnessed those scenes of terror and barbarity which drove him from France; he had not in fine perished miserably without relation or friend to sooth his sorrow.—But let us not anticipate events. Dombey departed for St. Jago after having filled twenty cases, of which six consisted of dried plants, the rest of minerals, shells, and a great number of designs that he had caused to be executed.

During his residence in this city, the reputation he had acquired procured him from the Spanish government a sufficiently troublesome commission. The quicksilver mines of Huanca-Velica having been ruined by the falling in of the earth, and those of Almaden not furnishing a sufficient supply for working the gold mines of Peru and Chili, the *regent de l'audience* of Chili received orders to cause others to be sought for. Dombey was applied to, and set off for the Cordilleras to examine the old mine of Coquimbo, which had been abandoned above fifty years: this he caused to be cleared out, and a plan taken of it. He discovered at Xarilla a mine a mine two leagues in extent; and brought back specimens of the ore, the assay of which left no room to doubt of the great importance of the discovery. These inquiries having led him to examine with care the course of the mines and the mode of working them, the signs by which they may be detected and the best means of rendering them productive, he addressed a memoir on the subject to the court of Spain. At the same time he pointed out a new mine of gold, and mineralogists were sent into Chili in compliance with his instructions.

In this excursion into the Cordilleras he had to travel a hundred leagues, and the labour to which he submitted nearly deprived him of his hearing. He expended 15,000 livres, the reimbursement of which he refused, alleging that he was happy to sacrifice his time and labour to be useful to Spain, as he thought by so doing he seconded the intentions of France; but that he could render no account of his expenses, except to the government which sent him, He had done the same with regard to his expenses in the analysis of the mineral waters of Caxatumbo.

In the midst of these labours his botanical pursuits were not neglected. He found in Chili one of the finest trees in the world, observed before by Molina, and imperfectly described under the name of *Pinus araucana*. It is fit for masts, having a trunk 150 feet long, and straight as an arrow. M. Daubenton has spoken of it in his Memoirs of Agriculture, and called it Basilaire*. Lamarck has described it under the name of Dombeya, and Jussieu under that of Araucaria. Dombey having pointed out to the Spaniards the use that might be made of this tree, and proved that a vessel which had been dismasted had been repaired with it at a small expense, the minister of the Indies gave him the thanks of his Catholic majesty. It is to be regretted that the seeds brought into Europe have not germinated, as there is reason to believe that the tree would succeed in the open ground in the southern departments of France, and that it would be very useful. The nuts are good to eat. Cones, male catkins, and planks of the wood, are preserved in the museum *.

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* *Mem. de la Soc. d'Agric. de Paris*, 1787, *trimestre d'hiver*. The title of the memoir of M. d'Aubenton is *Observ. sur un grand arbre du Chili*. He gives a figure and description of the wood, the bark, and the fruit of the Basilaire, brought over by Dombey.

Having amassed a considerable collection from Chili, and received the honours he merited, Dombey returned to Lima, with the intention of sailing for Europe. But his great reputation had again excited an envious disposition towards him, and injurious reports had been spread that he carried on an illicit correspondence with the English. And so far did these calumnies prevail, that when he went with his companions to the house of the visitor-general, this officer was so much prejudiced against him that he thought proper to receive him with contempt and insult. Dombey, whom no power could frighten, replied in a calm tone, "I would not put up with your insults if I were only a common traveller."—"And what would you have done?"—"I should have already pierced you to the heart; but, as I go to the king of France, to give him an account of your proceedings, and to obtain justice, it behoves me in the mean time to remain quiet." So saying, he left the house. The visitor having been better informed, thought it his duty to endeavour to repair these wrongs. Accordingly he sent again for the man he had so unjustly outraged, and in the presence of a large assembly, assured him of the regret his

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* From trials lately made, both in Chili and in Portugal, it has been found that the Araucaria is not so proper for masts as was at first supposed, the wood being too soft. Two other species of Araucaria have been discovered: the one, a native of Norfolk Island, is actually cultivated in the Kew garden under the name of Columbia, the beauty of these trees tempting the English to bestow on the genus the name of the discoverer of the New World.—AUTHOR. (It is L'Heritier who called it *Columbia*.—EDIT.)

former conduct had occasioned, and of the sincerity of his esteem, begging him to inform the viceroy of the reparation he had thus made him.

During the time Dombey waited the sailing of the vessel which was to convey him to France, he occupied himself assiduously in putting his collection in order. He packed the whole with the greatest care in seventy-three cases, which cost him 18,000 livres. At this time he was so ill that he had very little hope of revisiting his native country; but the fear of death affected him much less than the idea that his collection might be lost. He sent to M. Thouin a catalogue of the contents of the cases, requesting that, if they should arrive at Cadiz without him, he would procure a commission from the king of France, to go there to receive them. " If the cases," says he, " should be opened in your absence, every thing will be deranged. My manuscripts are in a box by themselves. You will dispose of all for the benefit of my country."—He recovered, however, and sailed with his collection on board the Peruano, commanded by M. J. de Echenique, on the 14th of April 1784. Their voyage was prosperous as far as fifty degrees S. L.; but as they approached Cape Horn the wind was contrary, and the sea so boisterous, that the ship was dismantled, and sustained otherwise so much damage, that it took a month to run ten degrees. The crew were overcome with fatigue and benumbed with cold; thirty-two of them had already perished, and seventy-three were on the sick list. It was necessary to repair the ship, and divers were wanting to stop the leaks; but the dejected sailors had not the resolution to submerse themselves under the water in so cold a season. Dombey seeing the general danger offered a premium of 1500 livres to the first who should throw himself into the sea. Animated by the hope of this reward twelve sailors offered themselves. The danger of sinking was now removed, though the ship was still ungovernable; and a breeze springing up from the south, they arrived at Rio Janeiro on the 4th of August. Here they were obliged to remain four months to refit. Dombey, expecting to proceed direct to Europe, was not prepared for this stay, having brought with him no letter of recommendation. His reputation had however preceded him. The fame of what he had done at Huanuco and at La Conception had reached Brazil. The viceroy Vasconcellos, informed of Dombey's arrival, sent a carriage for him, loaded him with marks of distinction, and taking him to his country-seat, showed him a fine collection of dried birds, insects, and butterflies, of which the viceroy insisted upon his choosing enough to fill a chest. For this very handsome present Dombey gave the person who brought it a thousand livres, little suspecting that the whole would be broken to pieces at Cadiz by the inspecting officers.

The rainy season not permitting any long botanical excursions, he collected only about two hundred new plants at Rio Janeiro; but he procured there seeds of a species of Waltheria, of which the inhabitants make very good cordage; butterflies, which still are the most beautiful among those admired in the galleries of the museum; a valuable sapphire; topazes of two colours; and a magnificent aigue-marine, the size of a pigeon's egg, for which he paid 1500 livres.

He took leave of the viceroy at the end of November 1784, when he again received the most flattering proofs of his esteem, and arrived in the port of Cadiz on the 22d of February 1785. In spite of the extreme delicacy of his health, he was overcome with joy at the near prospect of the moment when he should offer to his country the fruits of his voyage, little suspecting that this would prove the commencement of his misfortunes.

The collection made by MM. Ruiz and Pavon, who had been ordered to remain in America, together with the duplicates which Dombey had designed for the king of Spain, had been embarked on board the San Pedro de Alcantara. This ship separated in the storm, and never reached her destination. The whole collection on board the Peruano belonged to the king of France, as the captain's receipt acknowledged*. Dombey expected that his collection, being addressed to the minister of foreign affairs in France, would be freed from all visits of the custom-house officers. For, could it be suspected that prohibited articles were contained in the cases, the Spanish ambassador in Paris might have been directed to concert with the minister an appointment of some persons to attend the opening of the cases; or, if the inspection at Cadiz could not be dispensed with, at least care should have been taken that the necessary form was gone through without delay, and in such a manner that nothing might be damaged. If such behaviour was proper towards a naturalist sent by the king of France, how much more was it due to Dombey, for his conduct in America, where, at the imminent risque of his own, he had saved the life of a multitude of people, during a contagious disease, and had taught the means of curing and of preventing this malady, which frequently rages in Chili! He had discovered a mine of quicksilver to supply the place of those that were become less productive than formerly; he had detected new mines of gold and silver, and pointed out the signs by which they might be known, and the best mode of working them advantageously, he had supported the troops against the rebellion of Tapac-Maro; and it had been acknowledged that the preservation of the province of Huanuco was owing to his zeal; he had ceded to Spain duplicates of his plants and of his descriptions, without demanding any thing in exchange; he had never accepted of any remuneration from the Spanish government, and had expended more than 200,000 livres in its service.

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* This acknowledgment, which I have now before me, imports that the seventy-three cases with the collection of Dombey, made *at the expense of the king of France*, were destined for the royal cabinet and garden at Paris.

In spite of all these considerations, an order was sent for the immediate opening of the whole of the cases. These had been made with great care:—they were double; that is to say, each case was enclosed in another, and both cemented together, and covered with skins to keep out insects and moisture. To open them and fasten them up again was a work of time, requiring much address and precaution, especially such as contained brittle subjects: the contents of many of them were of course damaged.

In the next place, to repair the loss which his catholic majesty had sustained, Dombey was required to give up the half of his collection. But as the separation of what formed in itself a regular series, would of course considerably diminish its value, he refused to comply with this demand. The consent of the court of France was however obtained, and Dombey was under the necessity of submitting. Commissioners were appointed on the part of Spain to attend the division. The arrival of these from Madrid was to be waited for, and in the mean time the cases were stowed in low and damp warehouses, where access to them was denied even to Dombey. Nor could he take out the seeds, though the necessity for sowing them was on account of the season very pressing. An offer was made him to fix a value on his collection; but he answered, that, being made for the government of France, he could not possibly set a price upon it, nor would he sell any thing. A part of the things was incontestably his own property; but no respect was paid to this; even the cases packed at Rio Janeiro, belonging to Portugal, which contained the presents made him by the viceroy, were opened.

During all this time Dombey was obliged to remain at

Cadiz, without money, without credit, and without resource; and, though treated with contempt, was under the necessity of restraining his indignation. His claims were not heard, and spies were set to watch his conduct. Weary of these vexatious proceedings, he was tempted to renounce every thing, and to go and die in the bosom of his family; a resolution which he was prevented from executing only by the hope of being able to publish the fruit of his labours: but even this consolation was denied him by the jealousy of those at the head of the intrigue against him. An exact copy of his descriptions, and of the historical notes attached to his herbarium, was taken; nor was his own share of the collection given up, or his departure permitted, till he had given a written promise not to publish any thing before his companions should return from America, where they were detained by superior orders. Such an alarm was purposely excited in his breast, that he was induced to write to Paris, to prevent L'Heritier from publishing the descriptions and engravings of some new plants, which had been raised in the gardens from seeds sent by him from Peru. He thought only of saving himself by burying all that had passed in oblivion. Despair seized his mind, and exaggerated the horror of his situation; his memory and his reason became enfeebled, and he was no longer able to struggle against difficulties.

How, alas! did he now regret those beautiful countries where, in a delicious climate, he observed and collected the productions of nature; where he found comfort, even in braving the dangers of attending the sick; where he had acquired friends; where, finally, love had prepared for him a new home! But now all was lost. Sometimes, reanimated with his wonted energy, he thought, if he were to return to Peru alone, he should be able to excite an insurrection there; but immediately repelling with horror the idea of a criminal revenge, he again sunk into a state of dejection.

At last, after a stay of ten months, he left Cadiz and embarked with his packages for Havre, whence he reached Paris. His collection arrived there also, but this he seemed no longer to set any value upon. He was requested to publish an account of it, but refused, maintaining that the promise he had given, though obtained from him by force, was not in his mind the less sacred.

Upon this refusal M. de Buffon, after having granted him 60,000 livres, to discharge his debts, and a pension of 6000, took the herbarium to himself, and remitted it to L'Heritier, with directions to describe and get engraved all the new plants it contained. The Spanish minister being informed of these proceedings, made complaints; and the court of France being unwilling to offend that of Spain, M. de Buffon received orders to recall the herbarium. It was at this time that L'Heritier departed secretly with it to England, where he remained fifteen months occupied in describing it. This work has however never seen the light, the misfortunes of the revolution prevented its completion, and Dombey is deceased without having seen any thing published. L'Heritier has also perished by a most horrible catastrophe, before it was finished. In the mean time Messrs. Ruiz and Pavon having returned from Peru in 1788, it is at length from the Spanish press that this magnificent work, the Flora of Peru, has been ushered into the world.

It is impossible to avoid making here the following reflection: The vessel in which was embarked the collection belonging to the court of Spain being wrecked, it is from the specimens collected by Dombey, from his descriptions, and from the designs made under his care, that a part of the above mentioned work has been compiled; I say a part, because Ruiz and Pavon having staid four years longer in Peru, assisted by other fellow-labourers, must no doubt have added much to what Dombey did; nevertheless his name ought to have appeared in the title page[*].

However indifferent it may be to the progress of science, whether this work was published by France or by Spain, it ought nevertheless, for the reputation of Dombey, to be known how much he contributed towards it; and France herself is concerned, that the credit of the discoveries, made by a Frenchman, should not be taken from her. I will not attempt to point out the motives that should induce the editors of that work to seek to appropriate to themselves the labours of Dombey; or how the Spanish minister was deceived, and the claims of an unprotected traveller, who, separated from his companions, could not even call upon their testimony, were silenced. Why should I stop to develop a hateful intrigue, whilst I contemplate so elevated a character, the victim of jealousy and misfortune? I have proved that he has done great things, I have shown that he has not been recompensed, and I draw a veil over details most afflicting.

The plan of retiring into solitude at the foot of Mount Jura, there peaceably to finish his days, near to a good cultivator whom he had formerly known, was what now alone occupied the thoughts of Dombey. All his debts were paid, and he found himself sufficiently rich. Disgusted with celebrity, and with the sciences which he once so passionately loved, he gave to his friends whatever he could dispose of, and broke off all his correspondence with foreign naturalists, preserving a friendly intercourse with M. de Pavon alone.

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[*] It is indeed confessed in the preface that the history of the plants of Chili could not have appeared, unless Dombey had given the duplicates of his collection. "Et nisi D. O. M. Dombeyum incolumem servasset, qui Gades pervenit, et prout ab expeditionis initio præstabilitum fuerat, plantas quas multiplici numero, eo consilio exsiccarat, communicasset, jacturam stirpium Chilensium penitus irreparabilem adhuc deploraremus." But it is by no means proved that Dombey had ever promised duplicates of his plants; and allowing the fact to be so, that condition was already fulfilled by the division that had been made before at Callao.

The death of M. Guettard having occasioned a vacancy in the academy in the year 1786, the learned members turned their views to Dombey, and M. Jussieu undertook to present him; but he obstinately refused the intended honour. The Russian ambassador having offered, on account of the empress, 100,000 livres for the duplicates he still possessed, he returned his thanks with saying that an increase of fortune was not an equivalent to him for the pleasure of presenting to the naturalists of his own country specimens that had cost him so much trouble to acquire. Lastly, M. de Galvez wishing in some sort to recompense him for the sacrifices he had required of him in Spain, wrote to offer him a very considerable sum, which he without hesitation refused*.

As his plan of settling in the country could not be executed so expeditiously as he wished, he in the mean time retired to Lyons, to the house of some ladies, his relations, where he became a misanthrope, hardly ever seeing any one. Here he was during the siege of the city; and although he seemed to know nothing of what passed, and to pay no regard to life, yet the general desolation, and the surrounding dangers, overwhelmed him with terror. He resumed courage however to assist the sick, and to give succour to some unfortunate beings sinking under the horrors of famine. After the taking of the city, he hastened to quit this scene of carnage and devastation, to seek a peaceful asylum; but at that time blood was flowing in every direction, and the sights to which he was witness so harrowed up his soul, that he would no longer abide in France.

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* This fact was verified to me by M. Michel, doctor of physic at Fullins, a friend of Dombey's, who had read the letter from M. Galvez.

An order was however necessary to enable him to quit it: he therefore solicited a commission, which should authorize him to make a voyage to America. The committee of public safety having invited that of public instruction to send to the United States the standard of the new measures, the latter gave to Dombey this commission by an *arrêt* of the 26th Frimaire, year 2. He was likewise authorized to buy corn for France in the United States, and a number of queries were sent him relative to objects of science, of commerce, and of geography. Accordingly he embarked at Havre in an American brig the 24th Nivose year 2; but being obliged by a storm to put into Guadaloupe, he landed at Port-a-Petre the 21st Ventose.

Guadaloupe was at that time in the same distracted state as France. The revolutionary party had the command at Port-a-Petre: the governor resided at Basseterre, joined by such as wished to preserve the old order of things in the colony. Dombey being well received in quality of envoy from the republic, was for this reason suspected by the governor, who sent an order for him to repair to Basseterre. But although of principles opposite to the factious, he did not think proper to obey the summons; he resolved therefore to depart with the delegates of the revolutionary corps of representatives, who had freighted a small vessel for Philadelphia. He left Point-a-Petre the 1st Germinal, and went to sleep on a little island, whence the vessel was to take him the next day. During the night he was seized and thrown into prison at the bay Mahaut. Upon the knowledge of this event the inhabitants of Point-a-Petre assembled in a great crowd to demand the release of the envoy of the committee of public instruction, which was immediately granted. As soon as he made his appearance, the enraged mob, to avenge the treatment he had received, determined to seize the authors of it. Dombey having in vain employed entreaties to oppose this violence, placed himself before the leaders of the mob, in struggling with whom he fell into Salt River, and was taken out without signs of life. This accident diverting the attention of the people, they returned peaceably home. Thus the last act of his liberty was to defend those against whom he had reason to complain. A violent fever was the consequence of this fall and alarm; as soon as he recovered from which, to avoid new troubles, he thought it was most prudent to go before the governor. Being interrogated, he was found to be an upright man, and a stranger to all party spirit. He was ordered however to quit the colony on board the same vessel that had brought him thither, which was about to set sail. Scarcely had the ship got out of the road before she was attacked by two corsairs, against whom she could not defend herself. Dombey was detected disguised in the habit of a Spanish sailor, and thrown into prison at Montserrat, where disease, disappointment, and ill usage, soon put a period to his existence. His fate was for a long time unknown; for such was at that time the convulsed state of France, that no notice could be taken of the misfortunes of an absent man. The intelligence of his death was at length received at New York, and communicated to the committee of public instruction on the 27th Vendemiaire, year 3, about six months after the event took place.

Thus, after passing a life of perpetual agitation, and exposed to a thousand dangers, the victim of injustice, and robbed of the fruit of his labours, fell Dombey, without a friend to console him, and in distant captivity;—adding one to the list of those who have died martyrs to their zeal for natural history. But whilst we deplore his destiny, let us not consider it as without alleviation. Let it be remembered that his death arrived at that awful period when so many meritorious men were subjected to the revolutionary axe; that through his whole life his sentiments of benevolence,

volence, patriotism, and generosity were never diminished; that supported in the midst of dangers by his love of science, the idea of enriching his country never forsook him; that even his misanthropy, whilst it estranged him from the indifferent, attached him the more closely to a few friends, and the melancholy which cast a shade over his latter days, never changed the amiability of his character. Happy in the recollection of the good he had done to his contemporaries; happy in the foresight of the advantage posterity would reap from his discoveries, he knew how to find enjoyments beyond the power of man to embitter. Long accustomed to disappointment, he gave up every project, renounced every hope; and despising both fortune and fame, in the midst of the most turbulent times, lived only to friendship and to virtue.

I have already observed that the collection of Dombey was divided with Spain; that in Paris he had given to his patrons, to his friends, and to several naturalists, such duplicates as he could part with without diminishing the value of the collection designed for the government.

Mineralogy is indebted to him for two new minerals, viz. muriated copper, or green sand of Peru; and *l'euclase*, the finest crystal of which is preserved in the cabinet of M. de Drée. The *écoles des mines* possesses several valuable articles that came from him; but the greater part of the fruits of his voyages is contained in the national museum.

The gallery of minerals owes to him, besides the two before-mentioned substances, crystals of prismatic hyaline quartz; a very fine native emerald from Peru, in a matrix of lamellar limestone; several pieces of native gold branched in quartz; a piece of vein very rich in silver, above thirty pounds weight: the metal appears in it in the form of diverging branches; superb pieces of muriated silver, with shining granulated crystals; a mass of compact muriated silver, weighing above twelve pounds; specimens of ores of quicksilver; of flexible grit; of fossil bones of the gigantic animal of the Ohio, incrusted with silver, &c.

The gallery of zoology has received from him the Mouffette of Chili, described in the supplement to Buffon; many birds, amongst which are several species of Tangara; several fish, one unknown, described by M. de Lacépède, under the name of Gastrobranche de Dombey; the magnificent butterflies of Brazil, and several species of Curculio and of the Zygænæ[*]. His herbarium, consisting of about 1500 species, well preserved, is also deposited in the museum: amongst these are about sixty new genera, almost all of which have been published by Ruiz and Pavon, by names different from those given by Dombey. It is accompanied by a manuscript containing a history of the plants of Peru and Chili; the characters of the new genera; the description of the species, and an account of their uses[†]. It contains also many observations on the mines of Chili.

The garden of the museum is indebted to Dombey for several curious plants, which have thence been spread over the principal gardens of Europe. Such as the shrub known by the name of *Floripendio*[‡], which produces so picturesque an effect in our parterres for several months in the year, catching the eye at a distance by its bell-shaped flowers, a foot long, hanging floating from the extremities of the branches: the *Aristotelia maqui*, the berries of which afford a refreshing juice, in which Dombey found a great resource in the cure of the contagious fever of Chili; the species of sage which L'Heritier has named *Salvia formosa*, the scarlet flowers of which possess a lively brilliancy. But the most interesting of all the plants which Dombey has introduced amongst us, is the lemon-scented vervain (*Verbena triphylla* L'Her.). The leaves of this shrub, which grows to the height of fifteen feet, have the most delicious perfume of any plant that can be cultivated in Europe. At Paris it is necessary to protect it in the greenhouse during the severe frosts; but in the more temperate climates it thrives in the open air. Hedges of this shrub are already seen at Florence; and in the department of the Lower Alps it has been successfully cultivated by M. de Ruffo. When it shall come to be more dispersed in the south of France, it will be seen by the side of the roads, forming little groves, which from the elegant growth of the shrubs, the lightness of the panicles of flowers, of a lavender gray colour, the lively green of the foliage, and above all from their sweet reviving perfume, will in every respect exceed the groves of myrtle so celebrated by the poets. The dried leaves preserve all their odour, and an infusion of them is both palatable and wholesome: if this plant, as some botanists think, ought to be separated from the vervains and made a separate genus of, we should wish to see it consecrated to the name of Dombey[*].

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[*] Amongst these papilios are two very rare and of the greatest beauty; one has been named by Fabricius *Papilio Laërtes*, the other is a nondescript related to *Papilio Hecuba*. The weevils are not less remarkable, one is the *Curculio imperialis* of Fabricius; two others, *C. fastuosus* and *sumptuosus*, which Olivier has described from these individuals. The names given to these curculios point out how much they exceed in beauty and size what had been before observed.

[†] On comparing this manuscript with the *Flora Peruviana*, it may be seen that the Spanish authors have often copied the descriptions of the French botanist.

[‡] Cultivated in Peru, but, as Dombey assures us, brought from Chili. (*Datura arborea?* Ed.)

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[*] The following are the names of some other of the plants introduced into Europe by Dombey:—*Poa peruviana* Jacq.; *Alstroemeria Salsilla* L.; *Amaryllis tubiflora, maculata, chilensis* L'Her.; *Illecebrum frutescens* L'Her.; *Achyranthes porrigens* Jacq.; *Salvia scabiosæfolia* Fl. P.; *Hemitomus fruticosus* L'Her.; *Physalis prostrata* L'Her.; *Solanum corymbosum* Willd., *reclinatum* L'Her., *pinnatifidum* Link.; *Cestrum parqui* L'Her.; *Tourretia lappacea* Willd.;

Convolvulus

The gardens and the cabinets of natural history are not the only establishments that have been enriched by this traveller. The cabinet of antiquities in the national library has received from him the vases found in the tombs of the incas, and several curious monuments of the antient Peruvians.

Nothing of Dombey's has been printed, except a letter in the *Journal de Physique* (tom. xv.), upon the salt-petre found in Peru, and upon the luminous appearance of the sea. In this he observes that the sea is never phosphoric, except in the warm or temperate climates, and that it is especially so when the weather is disposed to be stormy[*].

XXX. *Chloris*

Convolvulus Hermanniæ L'Her.; *Lobelia Tupa* L.; *Buphthalmum sericeum* L'Her.; *Encelia canescens* Link.; *Sigesbeckia flosculosa* L'Her.; *Spilanthus albus* L'Her.; *Allionia incarnata* L'Her.; *Palava malvæfolia* Cav.; *Malope parviflora* L'Her.; *Malva scoparia* L'Her.; *Sida paniculata* L., *ricinoides, jatrophoides, pterosperma, nudiflora*, and *cistiflora* L'Her.; *Tetragonia crystallina* L'Her.; *Œnothera rosea* L.; *Celastrus octogonus* L'Her.; *Begonia octopetala* L'Her.

[*] I have neglected no means of satisfying myself of the truth of the facts contained in this memoir. The proofs are deposited at the office of the secretary to the museum, where they may be consulted. Amongst these are the register of his birth; his correspondence with M. Thouin and Jussieu; an authentic copy of the official letters written to him, and of the certificates given him in America; a copy of the letter addressed to the committee of public safety, containing the facts relative to his stay in Guadaloupe and the intelligence of his death; the certificate of the captain of the Peruano, which attests that the whole of the collection intrusted to his care was destined for France. I have also consulted the persons with whom Dombey had connection. Gilibert, professor of natural history at Lyons; Villars, professor at Grenoble; Le Blond, who botanized with him in Peru; and Dr. Michel, physician at Tullins, at whose house he remained some months, have all communicated to me several interesting circumstances which I have subjoined to the papers deposited at the museum. I was myself personally acquainted with him, and have heard him recount several particulars of his travels. As I could not further extend the limits of this memoir, I have been obliged to pass over in silence many facts. Thus, one of his friends wrote to inform me, that being thrown into prison during the reign of terror, he had been

visited

XXX. *Chloris Novæ Hollandiæ; or, Catalogue of the Plants of New Holland and Van Diemen's Island hitherto published, as far as they have come to the Knowledge of* J. DRYANDER.

[When the native place is not mentioned, it is to be understood that the plant has been found in the neighbourhood of Port Jackson.]

MONANDRIA.

Monogynia.

PHILYDRUM lanuginosum. *Gærtn. sem. i. p.* 62. *t.* 16. *Lamarck illustr.* 1. *p.* 12. *t.* 4. (*copied from Gærtner.*) *Willd. sp. pl. i. p.* 17. *Vahl enumer. i. p.* 9. *Sims in Bot. mag.* 783. *Poiret in Encyclop. method.* v. *p.* 269.
Garciana cochinchinensis. *Loureir. cochinch.* 15.
This plant has a wider range than the New Holland plants usually have. It was introduced into our gardens from the neighbourhood of Port Jackson; it was found by Sir Joseph Banks near Endeavour's River, and by Father Loureiro in Cochinchina.

Centrolepis fascicularis. *Labillard. nov. holl.* 7. *t.* 1. Van Diemen's Island.

Digynia.

Mniarum pedunculatum. *Labillard. nov. holl.* 8. *t.* 2. Van Diemen's Island. *Mr. David Nelson.*

DIANDRIA.

Monogynia.

Olea apetala. *Andrews's repos.* 316. Very different from

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visited there by Dombey, who brought with him a hundred louis, the savings of his economy; and upon the acceptance of these being refused—"Very well," said Dombey, "I shall preserve them for your family, should they happen to stand in need of assistance!"

M Gilibert has published, in the collection of the acts of the society of health at Lyons, year 6, page 453, a memoir on the life and labours of Dombey, which contains some interesting facts; but it is evident that the author has not enjoyed the same sources of information as myself.

Olea apetala of *Vahl's symb. iii. p.* 3. and *enum. i. p.* 42. from New Zealand; and a strange misapplication of name, to call a plant apetala which has both calyx and corolla. It is probably the same plant with the following:

Notelæa longifolia. *Ventenat choix* 25. a.

Notelæa ligustrina. *Ventenat choix* 25. b.

Pimelea linifolia. *Smith new holl.* 31. *t.* 11. *Willden. sp. pl. i. p.* 50. *Vahl enumer. i. p.* 305. *Sims in Botan. magaz.* 891.

Pimelea Cornucopiæ. *Vahl enumer. i. p.* 305. Bustard Bay, Cape Grafton, Endeavour's River. *Sir Joseph Banks.*

Pimelea ligustrina. *Labillard. nov. holl.* 9. *t.* 3. Van Diemen's Island.

Pimelea spatulata. *Labillard. nov. holl.* 9. *t.* 4. Van Diemen's Island.

Pimelea ferruginea. *Labillard. nov. holl.* 10. *t.* 5. West coast. *Mr. Archibald Menzies.*

Pimelea nivea. *Labillard. nov. holl.* 10. *t.* 6. Van Diemen's Island.

Pimelea drupacea. *Labillard. nov. holl.* 10. *t.* 7. Van Diemen's Island.

Pimelea clavata. *Labillard. nov. holl.* 11. Van Diemen's Island.

Utricularia dichotoma. *Labillard. nov. holl.* 11. *t.* 8. Van Diemen's Island.

TRIANDRIA.

Monogynia.

Hæmodorum. *Smith in Linn. soc. transact. iv. p.* 213.

Diplarrena Moræa. *Voyage de Labillard. i. p.* 157. *t.* 15. Van Diemen's Island.

Genosiris fragilis. *Labillard. nov. holl.* 13. *t.* 9. Van Diemen's Island.

Xyris operculata. *Labillard. nov. holl.* 14. *t.* 10. Van Diemen's Island. *Mr. David Nelson.*

Lepidosperma elatior. *Labillard. nov. holl.* 15. *t.* 11. Van Diemen's Island. *Mr. David Nelson.*

Lepidosperma gladiata. *Labillard. nov. holl.* 15. *t.* 12. Van Diemen's Island.

Lepidosperma longitudinalis. *Labillard. nov. holl.* 16. *t.* 13. Van Diemen's Island.

Lepidosperma globosa. *Labillard. nov. holl.* 16. *t.* 14. Van Diemen's Island.

Lepidosperma filiformis. *Labillard. nov. holl.* 17. *t.* 15. Van Diemen's Island.

Lepidosperma squamata. *Labillard. nov. holl.* 17. *t.* 16. Van Diemen's Island.

Lepidosperma tetragona. *Labillard. nov. holl.* 17. *t.* 17. Van Diemen's Island.

Schœnus acutus. *Labillard. nov. holl.* 18. *t.* 18. Van Diemen's Island.

Schœnus filum. *Labillard. nov. holl.* 18. *t.* 19. Van Diemen's Island.

Schœnus lanatus. *Labillard. nov. holl.* 19. *t.* 20. West coast. *Mr. Archibald Menzies.*

Digynia.

Agrostis ovata. *Labillard. nov. holl.* 19. *t.* 21. Van Diemen's Island.

Agrostis quadrifida. *Labillard. nov. holl.* 20. *t.* 22. Van Diemen's Island.

Agrostis virginica. *Labillard. nov. holl.* 20. *t.* 23. Van Diemen's Island.

Uniola distichophylla. *Labillard. nov. holl.* 21. *t.* 24. Van Diemen's Island.

Festuca pectinata. *Labillard. nov. holl.* 21. *t.* 25. Van Diemen's Island.

Festuca scabra. *Labillard. nov. holl.* 22. *t.* 26. Van Diemen's Island.

Festuca littoralis. *Labillard. nov. holl.* 22. *t.* 27. Van Diemen's Island.

Bromus arenarius. *Labillard. nov. holl.* 23. *t.* 28. West coast.

Stipa elegantissima. *Labillard. nov. holl.* 23. *t.* 29. Van Diemen's Island.

Stipa flavescens. *Labillard. nov. holl.* 24. *t.* 30. Van Diemen's Island.

Avena filiformis. *Labillard. nov. holl.* 24. *t.* 31. Van Diemen's Island. *Mr. David Nelson.*

Avena quadriseta. *Labillard. nov. holl.* 25. *t.* 32. Van Diemen's Island.

Arundo australis. *Cavanill. in Anales de hist. nat.* 1. *p.* 100.

Arundo semiannularis. *Labillard. nov. holl.* 26. *t.* 33. Van Diemen's Island. *Mr. David Nelson.*

Arundo penicillata. *Labillard. nov. holl.* 26. *t.* 34. Van Diemen's Island.

Arundo poæformis. *Labillard. nov. holl.* 27. *t.* 35. Van Diemen's Island.

TETRANDRIA.

Monogynia.

Protea anemonefolia. *Salisb. prodr.* 48. *Andrews's repos.* 332. *Sims in Bot. mag.* 697.

P. tridactylides. *Cavanill. in Anales de hist. nat.* i. *p.* 235. *t.* 16.

Protea pulchella. *Schrad. sert. hannov.* ii. *p.* 15. *t.* 7. *Willden. sp. pl.* i. *p.* 507. *Sims in Bot. mag.* 796. *Cavan. in Anales de hist. nat.* i. *p.* 237.

P. fucifolia. *Salisb. prodr.* 48.

Protea anethifolia. *Salisb. prodr.* 48.

Protea acufera. *Cavanill. in Anales de hist. nat.* 1. *p.* 236.

Protea dichotoma. *Cavanill. in Anales de hist. nat.* i. *p.* 237.

Banksia repens. *Voyage de Labillard.* i. *p.* 413. *t.* 23. West coast.

Banksia grandis. *Willden. sp. pl.* i. *p.* 535. West coast. *Mr. Archibald Menzies.*

Banksia nivea. *Voyage de Labillard. i. p.* 413. *t.* 24. West coast. *Mr. Archibald Menzies.*

Banksia dentata. *Linn. suppl.* 127. *Lamarck. illustr. i. p.* 242. Endeavour's River. *Sir Joseph Banks.*

Banksia integrifolia. *Linn. suppl.* 127. *Lamarck. illustr. i. p.* 242. *t.* 54. *f.* 2. (*copied from Gærtner.*) *Willden. sp. pl. i. p.* 535. *Cavanill. in Anales de hist. nat. i. p.* 229.
B. spicata. *Gærtn. sem.* i. *p.* 221. *t.* 48.

Banksia serrata. *Linn. suppl.* 126. *Lamarck. illustr. i. p.* 242. *t.* 54. *f.* 1. (*copied from Gærtner.*) *White's voyage,* 223, *with* 3 *plates. Willden. sp. pl. i. p.* 535. *Andrews's repos.* 82. *Bellenden recens.* 9. *Cavanill. in Anales de hist. nat. i. p.* 222.
B. conchifera. *Gærtn. sem.* i. *p.* 221. *t.* 48.
B. serratifolia. *Salisb. prodr.* 51.

Banksia præmorsa. *Andrews's repos.* 258.
B. asplenifolia. *Salisb. prodr.* 51.

Banksia ericæfolia. *Linn. suppl.* 127. *Lamarck. illustr. i. p.* 242. *Willden. sp. pl. i. p.* 536. *Andrews's repos.* 156. *Sims in Bot. mag.* 738. *Cavanill. in Anales de hist. nat. i. p.* 221.
B. phylicæfolia. *Salisb. prodr.* 51.

Banksia spinulosa. *Smith new holl.* 13. *t.* 4. *Willden. sp. pl. i. p.* 536. *Cavanill. in Anales de hist. nat. i. p.* 219.

Banksia microstachya. *Cavanill. in Anales de hist. nat. i. p.* 224.

Banksia oblongifolia. *Cavanill. in Anales de hist. nat. i. p.* 225.

Banksia robur. *Cavanill. in Anales de hist. nat. i. p.* 226.

Banksia marginata. *Cavanill. in Anales de hist. nat. i. p.* 227. *t.* 13.

Banksia oleæfolia. *Cavanill. in Anales de hist. nat. i. p.* 228. *t.* 14.—It seems to me hardly to differ from B. integrifolia.

Banksia glauca. *Cavanill. in Anales de hist. nat. i. p.* 230.

Banksia salicifolia. *Cavan. in Anales de hist. nat. i. p.* 231.

Conchium. *Smith in Linn. transact. iv. p.* 215. is the genus called by Prof. Schrader, Hakea.

Hakea glabra. *Schrad. sert. hannov. iii. p.* 27. *t.* 17.

H. pugioniformis. *Cavanill. in Anales de hist. nat. i. p.* 213. *t.* 11.

Banksia teretifolia. *Salisb. prodr.* 51.

Hakea pubescens. *Schrad. sert. hannov. iii. p.* 27.

H. gibbosa. *Cavanill. in Anales de hist. nat. i. p.* 214.

Banksia gibbosa. *White's voyage,* 224. *fig.* 2. *Willden. sp. pl. i. p.* 536.

Banksia pinifolia. *Salisb. prodr.* 51.

Hakea sericea. *Schrad. sert. hannov. iii. p.* 27.

Banksia tenuifolia. *Salisb. prodr.* 50.

Hakea dactyloides. *Cavanill. in Anales de hist. nat. i. p.* 215. *t.* 12.

Banksia dactyloides. *Gærtn. sem. i. p.* 221. *t.* 47. *Lamarck. illustr. i. p.* 242. *t.* 54. *f.* 3. *(copied from Gærtner.)*

Hakea ruscifolia. *Labill. nov. holl.* 30. *t.* 39. West coast.

Hakea epiglottis. *Labillard. nov. holl.* 30. *t.* 40. Van Diemen's Island.

Hakea clavata. *Labillard. nov. holl.* 30. *t.* 41. West coast.

Embothrium salicifolium. *Ventenat. Cels.* 8.

E. salignum. *Andrews's reposit.* 215.

Banksia oleæfolia. *Salisb. prodr.* 51. Without fruit the genus cannot be ascertained; but, from the inflorescentia axillaris, I should suppose that it belongs to the genus of Hakea, called by Dr. Smith Conchium.

Lambertia formosa. *Smith in Linn. soc. transact. iv. p.* 214. *and* 223. *tab.* 20. *Andrews's reposit.* 69. *Bellenden recens.* 10. *Cavan. in Anales de hist. nat. i. p.* 233. *t.* 15.

Protea nectarina. *Wendland sert. hannov. iv. p.* 5. *t.* 21.

Xylomelum. *Smith in Linn. soc. transact. iv. p.* 214.

Banksia pyriformis. *Gærtn. sem. i. p.* 220. *t.* 47. *La-*

marck. illustr. i. p. 242. *t.* 54. *f.* 4. (*copied from Gærtner.*) *White's voyage,* 224. *with fig. Willden. sp. pl. i. p.* 535.

Hakea piriformis. *Cavanill. in Anales de hist. nat. i. p.* 217.

Embothrium speciosissimum. *Smith new holl.* 19. *t.* 7. *Willden. sp. pl. i. p.* 537.

E. spathulatum. *Cavanill. ic. iv. p.* 60. *t.* 388.

Embothrium silaifolium. *Smith new holl.* 23. *t.* 8. *Willden. sp. pl. i. p.* 539.

E. herbaceum. *Cavanill. ic. iv. p.* 58. *t.* 384.

Embothrium sericeum. *Smith new holl.* 25. *t.* 9. *Willden. sp. pl. i. p.* 539. *Andrews's reposit.* 100. *Bellenden recens.* 9. *Sims in Bot. mag.* 862.

E. cytisoides. *Cavanill. ic. iv. p.* 60. *t.* 386. *f.* 2.

Embothrium lineare. *Andrews's reposit.* 272.

E. linearefolium. *Cavanill. ic. iv. p.* 59. *t.* 386. *f.* 1.

E. sericeum γ. *Smith new holl.* 27. *t.* 9. *f.* 6.

Embothrium buxifolium. *Smith new holl.* 29. *t.* 10. *Willden. sp. pl. i. p.* 538. *Andrews's reposit.* 218.

E. genianthum. *Cavanill. ic. iv. p.* 60. *t.* 387.

Embothrium tinctorium. *Labillard. nov. holl.* 31. *t.* 42, 43. Van Diemen's Island. *Mr. David Nelson.*

Embothrium truncatum. *Labillard. nov. holl.* 31. *t.* 44. Van Diemen's Island.

Adenanthos cuneata. *Labillard. nov. holl.* 28. *t.* 36. West coast.

Adenanthos obovata. *Labillard. nov. holl.* 29. *t.* 37. West coast.

Adenanthos sericea. *Labillard. nov. holl.* 29. *t.* 38. West coast. *Mr. Archibald Menzies.*

Conospermum. *Smith in Linn. soc. transact. iv. p.* 213.

Persoonia. *Smith in Linn. soc. transact. iv. p.* 215.

Persoonia latifolia. *Andrews's reposit.* 280.

Linkia levis. *Cavanill. ic. iv. p.* 61. *t.* 389.

Persoonia lanceolata. *Andrews's reposit.* 74. *Bellenden recens.* 9.

Persoonia linearis. *Andrews's reposit.* 77. *Bellenden recens.* 9. *Ventenat malmais.* 32. *Sims in Bot. mag.* 760.

Persoonia juniperina. *Labillard. nov. holl.* 33. *t.* 45. Van Diemen's Island.

Opercularia umbellata. *Gærtn. sem. i. p.* 112. *t.* 24. *Lamarck illustr. i. p.* 256. *t.* 58. *f.* 1. (*copied from Gærtner.*) *Willden. sp. pl. i. p.* 563. Botany Bay. *Sir Joseph Banks.*

Opercularia aspera. *Gærtn. sem. i. p.* 112. *t.* 24. *Lamarck illustr. i. p.* 256. *t.* 58. *f.* 2. (*copied from Gærtner.*) *Willden. sp. pl. i. p.* 564. Botany Bay. *Sir Joseph Banks.*

Opercularia diphylla. *Gærtn. sem. i. p.* 113. *Willden. sp. pl. i. p.* 564. Botany Bay. *Sir Joseph Banks.*

Opercularia paleacea. *Young in Linn. soc. transact. iii. p.* 30. *t.* 5.

Opercularia vaginata. *Labillard. nov. holl.* 34. *t.* 46. West coast. *Mr. Archibald Menzies.*

Opercularia spermacocea. *Labillard. nov. holl.* 34. *t.* 47. West coast.

Opercularia apiciflora. *Labillard. nov. holl.* 34. *t.* 48. West coast.

Exacum vaginale. *Labill. nov. holl.* 37. *t.* 51. West coast.

Exacum ovatum. *Labillard. nov. holl.* 38. *t.* 52. Van Diemen's Island. *Mr. David Nelson.*

Cissus antarcticus. *Ventenat choix* 21.

Zieria. *Smith in Linn. soc. transact. iv. p.* 216.

Mitrasacme pilosa. *Labillard. nov. holl.* 36. *t.* 49. Van Diemen's Island.

Cenarrhenes nitida. *Labillard. nov. holl.* 36. *t.* 50. Van Diemen's Island.

Tetragynia.

Goniocarpus micranthus. *Konig in Annals of bot. i. p.* 546. *t.* 12. *f.* 5.

Gonocarpus micranthus. *Thunberg. japon.* 69. *t.* 15:
Gonatocarpus micranthus. *Willden. sp. pl. i. p.* 690.
Port Jackson. *Mr. Caley.*

Goniocarpus scaber. *Konig in Annals of bot. i. p.* 547. *t.* 12. *f.* 6.
Gonocarpus tetragyna. *Labillard. nov. holl.* 39. *t.* 53.
Van Diemen's Island.

PENTANDRIA.

Monogynia.

Sheffieldia incana. *Labillard. nov. holl.* 40. *t.* 54.

Sprengelia incarnata. *Smith in Vetensk. acad. handling.* 1794. *p.* 260. *t.* 8. *Smith's tracts* 272. *t.* [illegible]. *Andrews's reposit.* 2. *Bellend. recens.* 12. *Willd. sp. pl. i. p.* 833.
Poiretia cucullata. *Cavanill. ic. iv. p.* 25. *t.* 343. *Poiret in encycloped. method. v. p.* 449.

Perojoa microphylla. *Cavanill. ic. iv. p.* 29. *t.* 349. *f.* 2.

Cryptandra. *Smith in Linn. soc. transact. iv. p.* 217.

Epacris grandiflora. *Willden. sp. pl. i. p.* 834. *Smith exot. bot. i. p.* 75. *t.* 39.
E. longiflora. *Cavanill. ic. iv. p.* 25. *t.* 344.

Epacris pungens. *Cavanill. ic. iv. p.* 26. *t.* 346. *Sims in Bot. mag.* 844.

Epacris pulchella. *Cavanill. ic. iv. p.* 26. *t.* 345.

Epacris obtusifolia. *Smith exot. bot. i. p.* 77. *t.* 40.

Epacris myrtifolia. *Labillard. nov. holl.* 41. *t.* 55. Van Diemen's Island.

Epacris heteronema. *Labillard. nov. holl.* 42. *t.* 56. Van Diemen's Island.

Epacris lanuginosa. *Labillard. nov. holl.* 42. *t.* 57. Van Diemen's Island.

Epacris impressa. *Labillard. nov. holl.* 43. *t.* 58. Van Diemen's Island. *Mr. David Nelson.*

Epacris cerinthoides. *Labillard. nov. holl.* 43. *t.* 59. Van Diemen's Island.

Styphelia tubiflora. *Smith new holl.* 45. *t.* 14. *Willden. sp. pl. i. p.* 835.

Styphelia triflora. *Andrews's repos.* 72. *Bellend. recens.* 13.

Styphelia viridis. *Andrews's reposit.* 312.

Styphelia ericoides. *Smith new holl.* 48. *Willden. sp. pl. i. p.* 835.

Epacris spuria. *Cavanill. ic. iv. p.* 27. *t.* 347. *f.* 1.

Styphelia strigosa. *Smith new holl.* 48. *Willden. sp. pl. i. p.* 835.

Styphelia scoparia. *Smith new holl.* 48. *Willden. sp. pl. i. p.* 835.

Styphelia daphnoides. *Smith new holl.* 48. *Willden. sp. pl. i. p.* 835.

Styphelia elliptica. *Smith new holl.* 49. *Willden. sp. pl. i. p.* 836.

Styphelia Gnidium. *Ventenat malmais.* 23.

S. parviflora. *Andrews's reposit.* 287.

(Styphelia) Epacris ? villosa. *Cav. ic. iv. p.* 27. *t.* 347. *f.* 2.

(Styphelia) Vintenatia humifusa. *Cavanill. ic. iv. p.* 27. *t.* 348.

(Styphelia) Vintenatia procumbens. *Cavanill. ic. iv. p.* 27. *t.* 349.

Styphelia Richei. *Labillard. nov. holl.* 44. *t.* 60. West coast. *Mr. Archibald Menzies.*

Styphelia glauca. *Labillard. nov. holl.* 45. *t.* 61. Van Diemen's Island. *Mr. David Nelson.*

Styphelia serrulata. *Labillard. nov. holl.* 45. *t.* 62. Van Diemen's Island.

Styphelia cordata. *Labill. nov. holl.* 46. *t.* 63. West coast.

Styphelia virgata. *Labillard. nov. holl.* 46. *t.* 64. Van Diemen's Island.

Styphelia collina. *Labillard. nov. holl.* 47. *t.* 65. Van Diemen's Island.

Styphelia trichocarpa. *Labillard. nov. holl.* 47. *t.* 66. Van Diemen's Island.

Styphelia obovata. *Labillard. nov. holl.* 48. *t.* 67. West coast.

Styphelia abietina. *Labillard, nov. holl.* 48. *t.* 68. Van Diemen's Island.

Styphelia Oxycedrus. *Labillard. nov. holl.* 49. *t.* 69. Van Diemen's Island.

Cyathodes glauca. *Labillard. nov. holl.* 57. *t.* 81. Van Diemen's Island.

Cyathodes disticha. *Labillard. nov. holl.* 58. *t.* 82. Van Diemen's Island.

Campanula littoralis. *Labillard. nov. holl,* 49. *t.* 70. Van Diemen's Island.

Lobelia gibbosa. *Labillard, nov. holl.* 50. *t.* 71. Van Diemen's Island.

Lobelia alata. *Labillard. nov. holl.* 51. *t.* 72. Van Diemen's Island.

Lobelia cuneiformis, *Labillard. nov. holl.* 51, *t.* 73. Van Diemen's Island.

Lobelia heterophylla. *Labill. nov. holl.* 52. *t.* 74. West coast.

Goodenia ovata. *Smith in Linn. soc. transact. ii. p.* 347. *Willden. sp. pl. i. p.* 954. *Ventenat in Mem. de l'institut, sc. phys. ii. p.* 321. *pl.* 10. *Ventenat Cels.* 3. *Andrews's reposit.* 68. *Bellenden recens.* 13. *Cavanill. in Anales de hist. nat. i. p.* 94, *t.* 6.

Goodenia lævigata. *Curtis bot. mag.* 287. *Willden. sp. pl. i. p.* 954.

G. albida. *Smith in Linn. soc. transact. ii. p.* 347. *Willden. sp. pl. i. p.* 954.

Scævola microcarpa. *Cavanill. in Anales de hist. nat. i. p.* 97. *t.* 9.

Goodenia paniculata. *Smith in Linn. soc. transact. ii. p.* 348. *Willden. sp. pl. i. p.* 954. *Cavanill. in Anales de hist. nat. i. p.* 95. *t.* 7.

Goodenia bellidifolia. *Smith in Linn. soc. transact. ii. p.* 349. *Willden. sp. pl. i. p.* 954.

Goodenia stricta. *Smith in Linn. soc. transact.* ii. *p.* 349. *Willden. sp. pl.* i. *p.* 955.

Goodenia ramosissima. *Smith in Linn. soc. transact.* ii. *p.* 349. *Smith new holl.* 15. *t.* 5. *Willden. sp. pl.* i. *p.* 955.

Scævola hispida. *Cavan. in Anales de hist. nat.* i. *p.* 99. *t.* 10.

Goodenia heterophylla. *Smith in Linn. soc. transact.* ii. *p.* 349. *Willden. sp. pl.* i. *p.* 955. *Cavanill. in Anales de hist. nat.* i. *p.* 96. *t.* 8.

Goodenia hederacea. *Smith in Linn. soc. transact.* ii. *p.* 349. *Willden. sp. pl.* i. *p.* 955.

Goodenia elongata. *Labillard. nov. holl.* 52. *t.* 75. Van Diemen's Island.

Goodenia repens. *Labillard. nov. holl.* 53. *t.* 76. Van Diemen's Island.

Goodenia calendulacea. *Andrews's reposit.* 22. *Bellenden recens.* 13.

Goodenia grandiflora. *Sims in Bot. mag.* 890.

Velleja. *Smith in Linn. soc. transact.* iv. *p.* 217.

Velleja trinervis. *Labill. nov. holl.* 54. *t.* 77. West coast.

Scævola globulifera. *Labillard. nov. holl.* 55. *t.* 78. West coast.

Scævola crassifolia. *Labillard. nov. holl.* 56. *t.* 79. West coast.

Scævola cuneiformis. *Labillard. nov. holl.* 56. *t.* 80. Van Diemen's Island.

Nicotiana undulata. *Ventenat malmais.* 10. *Sims in Bot. mag.* 673.

Billardiera scandens. *Smith new holl.* 1. *t.* 1. *Willden. sp. pl.* i. *p.* 1150. *Sims in Bot. mag.* 801.

Billardiera longiflora. *Labillard. nov. holl.* 64. *t.* 89. Van Diemen's Island.

Billardiera fusiformis. *Labillard. nov. holl.* 65. *t.* 90. Van Diemen's Island.

Lasiopetalum. *Smith in Linn. soc. transact. iv. p.* 216.

L. ferrugineum. *Andrews's reposit.* 208. *Ventenat malmais.* 59.

Lasiopetalum triphyllum. *Labillard. nov. holl.* 63. *t.* 88. West coast.

Sideroxylum sericeum. *Hort. Kew. i. p.* 262. *Salisb. prodr.* 138. *Willden. sp. pl. i. p.* 1090. was supposed to come from Van Diemen's Island; but Mr. Brown assures me that it is not found there, but in New Holland.

Ceanothus discolor. *Ventenat malmais.* 58.

Ceanothus spatulata. *Labill. nov. holl.* 60. *t.* 84. West coast.

Ceanothus globulosa. *Labillard. nov. holl.* 61. *t.* 85. West coast.

Pomaderris elliptica. *Labillard. nov. holl.* 61. *t.* 86. Van Diemen's Island.

Pomaderris apetala. *Labillard. nov. holl.* 62. *t.* 87. Van Diemen's Island.

Pittosporum undulatum. *Andrews's reposit.* 383.

Itea spinosa. *Andrews's reposit.* 314.

Bursaria spinosa. *Cavanill. ic. iv. p.* 30. *t.* 330.

Viola hederacea. *Labillard. nov. holl.* 66. *t.* 91. Van Diemen's Island.

Thesium drupaceum. *Labillard. nov. holl.* 68. *t.* 93. Van Diemen's Island.

Imbricaria crenulata. *Smith in Linn. soc. trans. iii. p.* 259. Jungia imbricata. *Gærtn. sem. i. p.* 175. *t.* 35. *Lamarck. illustr. ii. p.* 131. *t.* 143. (*copied from Gærtner.*)

Imbricaria ciliata. *Smith in Linn. soc. transact. iii. p.* 259.

(Imbricaria) Jungia tenella. *Gærtn. sem. i. p.* 176. Botany Bay. *Sir Joseph Banks.*

Canthium quadrifidum. *Labillard. nov. holl.* 69. *t.* 94. Van Diemen's Island.

Digynia.

Coprosma hirtella. *Labillard. nov. holl.* 70. *t.* 95. Van Diemen's Island.

Chenopodium baccatum. *Labillard. nov. holl.* 71. *t.* 96. Van Diemen's Island.

Swertia parnassifolia. *Labillard. nov. holl.* 72. *t.* 97. West coast.

Actinotus helianthi. *Labillard. nov. holl.* 67. *t.* 92. West coast.

Eryngium vesiculosum. *Labillard. nov. holl. t.* 98. As the letterpress relating to this and the two following plates has not yet come to hand, I do not know if they are from the west coast of New Holland, or from Van Diemen's Island.

Azorella lanceolata. *Labillard. nov. holl. t.* 99.

Azorella ovata. *Labillard. nov. holl. t.* 100.

Apium prostratum. *Ventenat malmais.* 81. Raised from seeds, brought by Captain Hamelin; but no information is given from what particular part of New Holland they were.

Trigynia.

Stackhousia. *Smith in Linn. soc. transact. iv. p.* 218.

Pentagynia.

Drosera peltata. *Willden. sp. pl. i. p.* 1546. *Thunb. Drosera n.* 8. *Poiret in Encyclop. method. vi. p.* 302. *Smith exot. bot. i. p.* 79. *t.* 41.

HEXANDRIA.

Monogynia.

Blandfordia nobilis. *Smith exot. bot. i. p.* 5. *t.* 4.

Sowerbæa juncea. *Smith in Linn. soc. transact. v. p.* 159. *t.* 6. *Andrews's reposit.* 81. *Bellenden recens.* 17.

Anthericum paniculatum. *Andrews's reposit.* 395.

Xanthorrhoea. *Smith in Linn. soc. transact. iv. p.* 219.

X. Hastile. *Dryand. catal. biblioth. Banks. iii. p.* 486.

Dianella cærulea. *Sims in Bot. mag.* 505. *Redouté liliac.* 79.

Anigozanthos rufa. *Voyage de Labillard. i. p.* 411. *t.* 22. West coast.

Doryanthes excelsa. *Correa in Linn. soc. transact. vi. p.* 213. *t.* 23, 24.

Octandria.

Monogynia.

Tetratheca juncea. *Smith new holl.* 5. *t.* 2. *Willden. sp. pl. ii. p.* 321.

Tetratheca ericifolia. *Smith exot. bot. i. p.* 37. *t.* 20.

Tetratheca glandulosa. *Smith exot. bot. i. p.* 39. *t.* 21.

Tetratheca thymifolia. *Smith exot. bot. i. p.* 41. *t.* 22.

Boronia pinnata. *Smith's tracts* 290. *t.* 4. *Andrews's reposit.* 58. *Bellenden recens.* 22. *Ventenat malmais.* 38.

Boronia serrulata. *Smith's tracts* 292. *t.* 5.

Boronia parviflora. *Smith's tracts* 295. *t.* 6.

Boronia polygalifolia. *Smith's tracts* 297. *t.* 7.

Corræa. *Smith in Linn. soc. transact. iv. p.* 219.

Corræa alba. *Andrews's reposit.* 18. *Bellenden recens.* 19. *Ventenat malmais.* 13. *Willden. sp. pl. ii. p.* 324.

(Corræa) Mazeutoxeron rufum. *Voyage de Labillard. ii. p.* 11. *t.* 17. Van Diemen's Island.

(Corræa) Mazeutoxeron reflexum. *Voyage Labillard. ii. p.* 66. *t.* 19. Van Diemen's Island.

Dodonæa triquetra. *Wendland's beobacht.* 44. *Willden. sp. pl. ii. p.* 343. *Andrews's reposit.* 230.

Bæckea densifolia. *Smith in Linn. soc. transact. iii. p.* 260. *Willden. sp. pl. ii. p.* 435.

Decandria.

Monogynia.

Pultenæa stipularis. *Smith new holl.* 35. *t.* 12. *Smith in Annals of bot. i. p.* 502. *Willden. sp. pl. ii. p.* 506. *Bot. mag.* 475. *Poiret in Encyclop. method. v. p.* 737.

Pultenæa paleacea. *Willden. sp. pl. ii. p.* 506. *Smith in Annals of bot. i. p.* 502. *Poiret in Encyclop. method. v. p.* 739.

Pultenæa linophylla. *Schrad. sert. hannov. ii. p. 28. t. 18. Willden. sp. pl. ii. p. 506. Smith in Annals of bot. i. p. 502. Poiret in Encyclop. method. v. p. 738.*

Pultenæa retusa. *Smith in Annals of bot. i. p. 502.*

Pultenæa daphnoides. *Wendland's beobacht. 43. Willden. sp. pl. ii. p. 507. Andrews's reposit. 98. Bellenden recens. 23. Smith in Annals of bot. i. p. 502. Poiret in Encyclop. method. v. p. 738.*

Pultenæa flexilis. *Smith in Annals of bot. i. p. 502.*

Pultenæa villosa. *Willden. sp. pl. ii. p. 507. Smith in Annals of bot. i. p. 503. Poiret in Encyclop. method. v. p. 739.*

Aotus villosa. *Smith in Annals of bot. i. p. 504.*
  Pultenæa villosa. *Andrews's reposit. 309.*
  Pultenæa ericoides. *Ventenat malmais. 35. Poiret in Encyclop. method. v. p. 738.*

Gompholobium grandiflorum. *Smith in Annals of bot. i. p. 505. Smith's exot. bot. 7. t. 5.*

Gompholobium latifolium. *Smith in Annals of bot. i. p. 505.*
  G. psoraleæfolium. *Hooker's paradis. 6.*
  G. fimbriatum. *Smith exot. bot. i. p. 113. t. 58.*

Gompholobium minus. *Smith in Annals of bot. i. p. 505.*

Gompholobium maculatum. *Andrews's reposit. 427.*

Gompholobium pinnatum. *Smith in Annals of bot. i. p. 505.*

Chorizema ilicifolium. *Voyage de Labillard. i. p. 405. t. 21. Smith in Annals of bot. i. p. 506.* West coast. *Mr. Archibald Menzies.*

Chorizema trilobum. *Smith in Annals of bot. i. p. 506.*
  Pultenæa ilicifolia. *Andrews's reposit. 320.*

Chorizema scandens. *Smith in Annals of bot. i. p. 506.*

Daviesia acicularis. *Smith in Annals of bot. i. p. 506.*

Daviesia ulicina. *Smith in Annals of bot. i. p. 506.*
  D. ulicifolia. *Andrews's reposit. 304.*

Daviesia umbellulata. *Smith in Annals of bot. i. p. 507.*

Daviesia corymbosa. *Smith in Annals of bot. i. p.* 507.

Daviesia squarrosa. *Smith in Annals of bot. i. p.* 507.

Viminaria denudata. *Smith in Annals of bot. i. p.* 507. *Smith exot. bot. i. p.* 51. *t.* 27.
  Daviesia denudata. *Ventenat choix* 6.
  Pultenæa juncea. *Willden. sp. pl. ii. p.* 506.
  Sophora juncea. *Schrad. sert. hannov. i. p.* 9. *t.* 3.

Sphærolobium vimineum. *Smith in Annals of bot. i. p.* 509.

Dillwynia ericifolia. *Smith in Annals of bot. i. p.* 510. *Smith exot. bot.* 47. *t.* 25.

Dillwynia floribunda. *Smith in Annals of bot. i. p.* 510. *Smith exot. bot. i. p.* 49. *t.* 26.

Dillwynia glaberrima. *Smith in Annals of bot. i. p.* 510.

Mirbelia reticulata. *Smith in Annals of bot. i. p.* 511.
  Pultenæa rubiæfolia. *Andrews's reposit.* 351.

Ceratopetalum gummiferum. *Smith new holl.* 9. *t.* 3. *Willden. sp. pl. ii. p.* 580.

Eriostemon. *Smith in Linn. soc. transact. iv. p.* 221.

Crowea. *Smith in Linn. soc. trans. iv. p.* 222.
  C. saligna. *Andrews's reposit.* 79. *Bellenden recens.* 25. *Ventenat malmais.* 7.

Phebalium squamulosum. *Ventenat malmais.* 102.

ICOSANDRIA.

Monogynia.

Leptospermum flavescens. *Smith in Linn. soc. transact. iii. p.* 262. *Willden. sp. pl. ii. p.* 949.
  L. polygalifolium. *Salisb. prodr.* 350.
  L. Thea. *Willden. sp. pl. ii. p.* 949.
  Melaleuca Thea. *Schrad. sert. hannov. iii. p.* 24. *t.* 14.

Leptospermum attenuatum. *Smith in Linn. soc. transact. iii. p.* 262. *Willden. sp. pl. ii. p.* 949.

Leptospermum lanigerum. *Smith in Linn. soc. transact. iii. p.* 263. *Willden. sp. pl. ii. p.* 949.
  Melaleuca? trinervia. *White's voyage* 229. *with fig.* Port Jackson.

Leptospermum australe. *Salisb. prodr.* 350.
Philadelphus laniger, α. canescens. *Hort. Kew.* 156. Van Diemen's Island.

Leptospermum pubescens. *Willden. sp. pl. ii. p.* 950.
Philadelphus laniger, β. piliger. *Hort. Kew.* 156. Van Diemen's Island.

Leptospermum parvifolium. *Smith in Linn. soc. trans. iii. p.* 263. *Willden. sp. pl. ii. p.* 950.

Leptospermum arachnoideum. *Smith in Linn. soc. trans. iii. p.* 263. *Willden. sp. pl. ii. p.* 950.
L. arachnoides. *Gærtn. sem. i. p.* 174. *t.* 35. *Lamarck illustr. t.* 423. *f.* 3.

Leptospermum juniperinum. *Smith in Linn. soc. trans. iii. p.* 263. *Willd. sp. pl. ii. p.* 950. *Ventenat malmais.* 89.
Melaleuca tenuifolia. *Wendland's beobacht.* 50.

Leptospermum baccatum. *Smith in Linn. soc. transact. iii. p.* 264. *Willden. sp. pl. ii. p.* 950.

Leptospermum ambiguum. *Sm. in Linn. soc. trans. iii. p.* 264. *Sm. exot. bot. i. p.* 15. *t.* 59. *Willd. sp. pl. ii. p.* 950.
L. recurvifolium. *Salisb. prodr.* 350.
Metrosideros coriifolia. *Ventenat malmais.* 46.

Leptospermum grandifolium. *Smith in Linn. soc. trans. vi. p.* 299.

Leptospermum imbricatum. *Smith in Linn. soc. trans. vi. p.* 300.

Leptospermum squarrosum. *Gærtn. sem. i. p.* 174. *t.* 35. *Lamarck. illustr. t.* 423. *f.* 2. Botany Bay. *Sir Joseph Banks.*

Leptospermum umbellatum. *Gærtn. sem. i. p.* 174. *t.* 35. *Lamarck illustr. t.* 423. *f.* 4. The northern parts of New South Wales. *Sir Joseph Banks.*

Leptospermum triloculare. *Ventenat malmais.* 88.

Leptospermum stellatum. *Cavan. ic. iv. p.* 16. *t.* 330. *f.* 1.

Leptospermum porophyllum. *Cav. ic. iv. p.* 17. *t.* 330. *f.* 2.

Leptospermum multiflorum. *Cav. ic. iv. p.* 17. *t.* 331. *f.* 1.

Leptospermum juniperifolium. *Cav. ic. iv. p.* 18. *t.* 331. *f.* 2.

Fabricia lævigata. *Gærtn. sem. i. p.* 175. *Smith in Linn. soc. transact. iii. p.* 265. *Willden. sp. pl. ii. p.* 951.

Fabricia myrtifolia. *Gærtn. sem. i. p.* 175. *t.* 35. *f.* 4. *Lamarck illustr. t.* 423. *Willden. sp. pl. ii. p.* 951. Endeavour's River. *Sir Joseph Banks.*

Angophora cordifolia. *Cavanill. ic. iv. p.* 21. *t.* 338.

Metrosideros hispida. *Smith in Linn. soc. transact. iii. p.* 267. *Smith's exot. bot. i. p.* 81. *t.* 42. *Willden. sp. pl. ii. p.* 952.

Metrosideros anomala. *Ventenat malmais.* 5.

Metrosidera hirsuta. *Andrews's reposit.* 281.

Angophora lanceolata. *Cavanill. ic. iv. p.* 22. *t.* 339.

Metrosideros costata. *Gærtn. sem. i. p.* 171. *t.* 34. *Lamarck. illustr. t.* 421. *f.* 3. *Smith in Linn. soc. trans. iii. p.* 267. *Willden. sp. pl. ii. p.* 952.

Metrosideros floribunda. *Smith in Linn. soc. transact. iii. p.* 267. *Willden. sp. pl. ii. p.* 952.

Metrosideros glomulifera. *Smith in Linn. soc. transact. iii. p.* 269. *Willden. sp. pl. ii. p.* 954.

Metrosideros linearis. *Smith in Linn. soc. trans. iii. p.* 271. *Willden. sp. pl. ii. p.* 955.

Melaleuca linearis. *Schrad. sert. hannov. ii. p.* 19. *t.* 11.

Metrosideros lanceolata. *Smith in Linn. soc. transact. iii. p.* 272. *Willden. sp. pl. ii. p.* 955.

M. citrina. *Curtis bot. mag.* 260.

M. decora. *Salisb. prodr.* 352.

M. marginata. *Cavanill. ic. iv. p.* 18. *t.* 332.

Metrosideros lophantha. *Ventenat Cels.* 69.

Metrosideros saligna. *Smith in Linn. soc. transact. iii. p.* 272. *Willden. sp. pl. ii. p.* 956. *Ventenat Cels.* 70.

Metrosideros viminalis. *Gærtn. sem. i. p.* 171. *t.* 34. *Lamarck illustr. t.* 421. *f.* 6. *Willden. sp. pl. ii. p.* 956. Endeavour's River. *Sir Joseph Banks.* The last five come very near to one another, and I doubt of their being all different species.

Metrosideros capitata. *Smith in Linn. soc. transact. iii. p.* 273. *Willden. sp. pl. ii. p.* 956.

Metrosideros umbellata. *Cavanill. ic. iv. p.* 20. *t.* 337.

Metrosideros hypericifolia. *Salisb. prodr.* 351.

Metrosideros apocynifolia. *Salisb. prodr.* 351.

Metrosideros gracilis. *Salisb. prodr.* 352. The last three not having flowered, it is uncertain to which of the genera of this family they belong.

Myrtus tenuifolia. *Smith in Linn. soc. trans. iii. p.* 280. *Willden. sp. pl. ii. p.* 968.

Myrtus trinervia. *Smith in Linn. soc. transact. iii. p.* 280. *Willd. sp. pl. ii. p.* 969.

Eugenia elliptica. *Smith in Linn. soc. transact. iii. p.* 281. *Willden. sp. pl. ii. p.* 966.

Eucalyptus robusta. *Smith new holl.* 39. *t.* 13. *Smith in Linn. soc. trans. iii. p.* 283. *Willden. sp. pl. ii. p.* 976.

Eucalyptus pilularis. *Smith in Linn. soc. trans. iii. p.* 284. *Willden. sp. pl. ii. p.* 976.

Eucalyptus tereticornis. *Smith new holl.* 41. *Smith in Linn. soc. trans. iii. p.* 284. *Willden. sp. pl. ii. p.* 976.

Eucalyptus resinifera. *White's voyage,* 231, *with fig. Smith in Linn. soc. transact. iii. p.* 284. *Willden. sp. pl. ii. p.* 977. *Andrews's reposit.* 400.

Metrosideros gummifera. *Gærtn. sem. i. p.* 170. *t.* 34. *Lamarck illustr. t.* 421. *f.* 2.

Metrosideros propinqua. *Salisb. prodr.* 351.

Eucalyptus capitellata. *Smith new holl.* 42. *Smith in Linn. soc. transact. iii. p.* 285. *Willden. sp. pl. ii. p.* 977.

Metrosideros coriacea. *Salisb. prodr.* 352. Figure of the fruit in *White's voyage, plate at p.* 226. *fig. a.*

Eucalyptus saligna. *Smith in Linn. soc. trans. iii. p.* 285. *Willden. sp. pl. ii. p.* 977.

Eucalyptus botryoides. *Smith in Linn. soc. transact. iii. p.* 286. *Willden. sp. pl. ii. p.* 978.

E. platypodos. *Cavanill. ic. iv. p.* 23. *t.* 341.

Eucalyptus hæmastoma. *Smith in Linn. soc. transact. iii. p.* 286. *Willden. sp. pl. ii. p.* 978.

Eucalyptus piperita. *White's voyage,* 226, *with fig. of leaves. Smith new holl.* 42. *Smith in Linn. soc. trans. iii. p.* 286. *Willden. sp. pl. ii. p.* 978.
Metrosideros aromatica. *Salisb. prodr.* 351.

Eucalyptus obliqua. *L'Herit. sert. angl. t.* 20. *Hort. Kew. ii. p.* 157. *Smith new holl.* 43. *Smith in Linn. soc. transact. iii. p.* 287. *Willden. sp. pl. ii. p.* 979. *Salisb. prodr.* 352. *Lamarck illustr. t.* 422. (*copied from L'Heritier.*) *Cavanill. ic. iv. p.* 24. *Hooker's parad.* 15. Van Diemen's Island.

Eucalyptus corymbosa. *Smith new holl.* 43. *Smith in Linn. soc. transact. iii. p.* 287. *Willden. sp. pl. ii. p.* 979. *Cavanill. ic. iv. p.* 23. *t.* 340.

Eucalyptus paniculata. *Smith in Linn. soc. transact. iii. p.* 287. *Willden. sp. pl. ii. p.* 978.

Eucalyptus marginata. *Sm. in Linn. soc. trans. vi. p.* 302.

(Eucalyptus) Metrosideros salicifolia. *Gærtn. sem. i. p.* 171. *t.* 34. *Lamarck illustr. t.* 421. *f.* 4. Bay of Inlets, Cape Grafton, Endeavour's River, Point Lookout, Possession Island. *Sir Joseph Banks.*

Eucalyptus rostratus. *Cavanill. ic. iv. p.* 23. *t.* 342.

Eucalyptus salicifolius. *Cavanill. ic. iv. p.* 24.

Eucalyptus racemosus. *Cavanill. ic. iv. p.* 24.

Eucalyptus cornuta. *Voyage de Labillard. i. p.* 403. *t.* 20. West coast. *Mr. Archibald Menzies.*

Eucalyptus globulus. *Voyage de Labillard. i. p.* 151. *t.* 13. Van Diemen's Island.

POLYANDRIA.

Digynia.

Bauera rubiæfolia. *Salisb. in Ann. of bot. i. p.* 514. *t.* 10.
Bauera rubioides. *Andrews's reposit.* 198. *Sims in Bot. mag.* 715. *Ventenat malmais.* 96.

Pentagynia.

Pentagynia.

Hibbertia volubilis. *Andrews's reposit.* 126.
Dillenia volubilis. *Ventenat choix* 11.
Dillenia turneræflora. *Bellenden recens.* 27.
(Hibbertia) Dillenia scandens. *Willden. sp. pl. ii. p.* 1251.
Dillenia speciosa. *Curtis bot. mag.* 449. I doubt of these two being different species. The fruit must determine if it is a different genus from Dillenia. The habitus is certainly very different.

Hexagynia.

Carpodontus lucida. *Voyage de Labillard. ii. p.* 16. *t.* 18. Van Diemen's Island.

DIDYNAMIA.

Gymnospermia.

Westringia rosmariniformis. *Smith in Vetensk. acad. handling.* 1797. *p.* 173. *t.* 8. *Smith's tracts,* 282. *t.* 3.
W. rosmarinacea. *Andrews's reposit.* 214.

Angiospermia.

(Myoporum) Pogonia debilis. *Andrews's reposit.* 212.
(Myoporum) Pogonia glabra. *Andrews's reposit.* 283.
Andreusia glabra. *Ventenat malmais.* 108.
(Myoporum) Pogonia tetrandra. *Labillard. nov. holl.* 59. *t.* 59. West coast. These plants belong to the genus Myoporum of Dr. Solander, adopted by the younger Forster, and from him by Professor Willdenow.
Josephinia Imperatricis. *Ventenat malmais.* 67. Raised from seeds brought by Capt. Hamelin from New Holland.

MONADELPHIA.

Polyandria.

Hibiscus heterophyllus. *Ventenat malmais.* 103.
Hibiscus grandiflorus. *Hooker's paradis.* 22.

DIADELPHIA.

Decandria.

Platylobium formosum. *Smith in Linn. soc. transact. ii. p.* 350. *Smith's new holl.* 17. *t.* 6. *Willden. sp. pl. iii. p.* 921. *Bot. mag.* 469. *Ventenat malmais.* 31.

Platylobium parviflorum. *Smith new holl.* 18. *Willden. sp. pl. iii. p.* 921.

Platylobium scolopendrum. *Andrews's reposit.* 191. *Ventenat malmais.* 55.

Platylobium microphyllum. *Sims in Bot. mag.* 863.

Bossiæa heterophylla. *Ventenat Cels.* 7. *Willden. sp. pl. iii. p.* 972.

Platylobium lanceolatum. *Andrews's reposit.* 205.

(Bossiæa) Platylobium ovatum. *Andrews's reposit.* 266.

Rafnia retusa. *Ventenat malmais.* 53.

Colutea galegifolia. *Sims in Bot. mag.* 792.

Vicia galegifolia. *Andrews's reposit.* 319.

Glycine bimaculata. *Curtis bot. mag.* 263. *Willden. sp. pl. iii. p.* 1067.

Kennedia monophylla. *Ventenat malmais.* 106.

Glycine rubicunda. *Curtis bot. mag.* 268. *Willden. sp. pl. iii. p.* 1065.

Kennedia rubicunda. *Ventenat malmais.* 104.

Glycine coccinea. *Curtis bot. mag.* 270. *Willden. sp. pl. iii. p.* 1065.

Kennedia coccinea. *Ventenat malmais.* 105.

Glycine clandestina. *Wendland's beobacht.* 54. *Willden. sp. pl. iii. p.* 1054.

Indigofera australis. *Willden. sp. pl. iii. p.* 1235. *Ventenat malmais.* 45.

POLYADELPHIA.

Polyandria.

Melaleuca viridiflora. *Gærtn. sem. i. p.* 173. *t.* 35. *Lamarck illustr. t.* 641. *f.* 3. *Smith in Linn. soc. trans. iii. p.* 275. *Willden. sp. pl. iii. p.* 1429.

Metrosideros quinquenervia. *Cavan. ic. iv. p.* 19. *t.* 333. I doubt this being the same species as the Leucadendron β. of *Linn. suppl.* which comes from New Caledonia. It is by mistake that New Holland is there mentioned as its native place, as well as New Caledonia. Dr. Forster and Dr. Sparrman had not touched in any part of New Holland.

Melaleuca laurina. *Smith in Linn. soc. transact. iii. p.* 275. *Willden. sp. pl. iii. p.* 1429.

Melaleuca squarrosa. *Smith in Linn. soc. trans. vi. p.* 300. *Willden. sp. pl. iii. p.* 1430.

M. myrtifolia. *Ventenat malmais.* 47.

Melaleuca stypheloides. *Smith in Linn. soc. transact. iii. p.* 275. *Willden. sp. pl. iii. p.* 1430.

Melaleuca ericifolia. *Smith in Linn. soc. trans. iii. p.* 276. *Smith exot. bot. i. p.* 65. *t.* 34. *Willden. sp. pl. iii. p.* 1430.

Melaleuca nodosa. *Smith in Linn. soc. trans. iii. p.* 276. *Smith exot. bot. i. p.* 67. *t.* 35. *Willden. sp. pl. iii. p.* 1431.

Metrosideros nodosa. *Gærtn. sem. i. p.* 172. *t.* 34. *Cavanill. ic. iv. p.* 9. *t.* 334.

Melaleuca armillaris. *Smith in Linn. soc. trans. iii. p.* 277. *Willden. sp. pl. iii. p.* 1431.

M. ericæfolia. *Andrews's reposit.* 175. *Ventenat malmais.* 76.

Metrosideros armillaris. *Gærtn. sem. i. p.* 171. *t.* 34. *Lamarck illustr. t.* 421. *f.* 5. *Cavanill. ic. iv. p.* 19. *t.* 335.

Melaleuca genistifolia. *Smith in Linn. soc. transact. iii. p.* 277. *Smith exot. bot. i. p.* 107. *t.* 55. *Willden. sp. pl. iii. p.* 1431.

Melaleuca linariifolia. *Smith in Linn. soc. transact. iii. p.* 278. *Smith exot. bot. i. p.* 109. *t.* 56. *Willden. sp. pl. iii. p.* 1432.

Metrosideros hyssopifolia. *Cavanill. ic. iv. p.* 20. *t.* 336. *f.* 1.

Melaleuca thymifolia. *Smith in Linn. soc. trans. iii. p.* 278. *Smith exot. bot. i. p.* 69. *t.* 36. *Willden. sp. pl. iii. p.* 1432.

M. gnidiæfolia. *Ventenat malmais.* 4.

M. coronata. *Andrews's reposit.* 278.

Metrosideros calycina. *Cavanill. ic. iv. p.* 20. *t.* 336. *f.* 2.

Melaleuca hypericifolia. *Smith in Linn. soc. transact. iii. p.* 279. *Ventenat Cels.* 10. *Andrews's reposit.* 200. *Willden. sp. pl. iii. p.* 1433.

Melaleuca angustifolia. *Gærtn. sem. i. p.* 172. *t.* 35. *Lamarck illustr. t.* 641. *f.* 1. Endeavour's River. *Sir Joseph Banks.*

Melaleuca suaveolens. *Gærtn. sem. i. p.* 173. *t.* 35. *Lamarck illustr. t.* 641. *f.* 2. Endeavour's River. Sir *Joseph Banks.*

SYNGENESIA.

Polygamia Æqualis.

Humea elegans. *Smith exot. bot. i. p.* 1. *t.* 1.

Calomeria amaranthoides. *Ventenat malmais.* 73.

Polygamia Superflua.

Xeranthemum bracteatum. *Ventenat malmais.* 2. *Andrews's reposit.* 375.

Aster tomentosus. *Wendland sert. hannov. iv. p.* 8. *t.* 24. *Willden. sp. pl. iii. p.* 2015.

Aster dentatus. *Andrews's repos.* 61. *Bellend. recens.* 34.

Polygamia Necessaria.

Gymnostiles anthemifolia. *Jussieu in Annales du museum d'hist. nat. iv. p.* 258. *t.* 61. *f.* 1.

Polygamia Segregata.

Richea glauca. *Voyage de Labillard. i. p.* 186. *t.* 16. Van

Diemen's Island. The same genus, if not species, as Craspedia uniflora of Forster. *Willd. sp. pl. iii. p.* 2393.

GYNANDRIA.

Diandria.

Diuris punctata. *Smith exot. bot. i. p.* 13. *t.* 8.

Diuris aurea. *Smith exot. bot. i. p.* 15. *t.* 9.

Diuris. *Swartz in Vetensk. acad. handling.* 1800. *p.* 229. *t.* 3. *fig. M.*

Diuris maculata. *Smith exot. bot. i. p.* 57. *t.* 30.

Dendrobium speciosum. *Smith exot. bot. i. p.* 17. *t.* 10.

Dendrobium linguiforme. *Smith exot. bot. i. p.* 19. *t.* 11.

Dendrobium punctatum. *Smith exot. bot. i. p.* 21. *t.* 12.

Thelymitra ixioides. *Swartz in Vetensk. acad. handling.* 1800. *p.* 228. *t.* 3. *fig.* L. *a,* C, *d–g. Smith exot. bot. i. p.* 55. *t.* 29.

Tetrandria.

Ventenatia major. *Smith exot. bot. ii. p.* 13. *t.* 66.

Ventenatia minor. *Smith exot. bot. ii. p.* 15. *t.* 67.

MONOECIA.

Monandria.

Casuarina stricta. *Hort. Kew. iii.* 320. *Andrews's reposit.* 346.

C. excelsa. *Salisb. prodr.* 2.

Casuarina torulosa. *Hort. Kew. iii.* 320.

C. lugubris. *Salisb. prodr.* 2. Bay of Inlets. *Sir Joseph Banks.*

Casuarina littoralis. *Salisb. prodr.* 2.

Casuarina distyla. *Ventenat Cels.* 62. Van Diemen's Island.

Pentandria.

Exocarpus cupressiformis. *Voyage de Labillard. i. p.* 155. *t.* 14. Van Diemen's Island.

DIOECIA.

Hexandria.

Smilax? glyciphylla. *White's voyage*, 230. *fig. A. B.*

POLYGAMIA.

Mimosa verticillata. *L'Herit. sert. angl. p.* 30. *Hort. Kew. iii. p.* 438. *Curtis bot. mag.* 110. *Salisb. prodr.* 324. *Ventenat malmais.* 63. Van Diemen's Island.

Mimosa ulicifolia. *Salisb. prodr.* 324.
M. juniperina. *Ventenat malmais.* 64.

Mimosa linifolia. *Ventenat Cels.* 2. *Andrews's repos.* 394.
M. linearis. *Wendland's beobacht.* 56.

Mimosa floribunda. *Ventenat choix* 13.

Mimosa stricta. *Andrews's repos.* 53. *Bellend. recens.* 38.

Mimosa longifolia. *Andrews's reposit.* 207. *Ventenat malmais.* 62.
M. binervia. *Wendland's beobacht.* 56.

Mimosa suaveolens. *Smith in Linn. soc. trans. i. p.* 253.
M. obliqua. *Lamarck. in Journal d'hist. nat. i. p.* 89. *t.* 5. *Wendland's beobacht.* 57.
M. ambigua. *Salisb. prodr.* 325.

Mimosa myrtifolia. *Smith in Linn. soc. transact. i. p.* 252. *Smith's new. holl.* 51. *t.* 15. *Curtis bot. mag.* 302.

Mimosa hispidula. *Smith new holl.* 53. *t.* 16.

Mimosa decipiens. *Konig in Annals of bot. i. p.* 366. *t.* 8.
Adiantum truncatum. *Burm. Ind.* 234. *t.* 66. *f.* 4. *Linn. syst. nat. ed. xiii. p.* 790. West coast. *Mr. Archibald Menzies.*

Mimosa discolor. *Andrews's reposit.* 235.
M. botrycephala. *Ventenat Cels.* 1.
M. terminalis. *Salisb. prodr.* 325.
M. paniculata. *Wendland's beobacht.* 57.

Mimosa decurrens. *Wendland's beobacht.* 57. *Ventenat malmais.* 61.

Mimosa pubescens. *Ventenat malmais.* 21.
Mimosa distachya. *Ventenat Cels.* 20. West coast.

CRYPTOGAMIA.

Filices.

Acrostichum alcicorne. *Swartz in Schrader's journal für die botanik,* 1800. *vol. ii. p.* 11.
  A. stemaria. *Palisot de Beauvois, flore d'Oware* 2. *t.* 2.
  Cornu alcis Cimbor dicta. *Bont. jav.* 121. *cum fig.*
  Botany Bay. *Sir Joseph Banks.*

Schizæa bifida. *Willden. in Nov. act. acad. erfurt. ii. p.* 30. *t.* 3. *f.* 3.
  Acrostichum bifurcatum. *Cavanilles in Annales de hist. nat. i. p.* 105.

PALMÆ.

Zamia spiralis. *Salisb. prodr.* 401.

APPENDIX.

The following Plants were collected on the West Coast, by DAMPIER, *in* 1699.

Chrysanthemum exiguum Nov. hollandicum, Coronopifoliis, flosculis fistulosis. *Pluken. amalth. append. t.* 450. *f.* 10.

Erica Nov. hollandica quaterno ordine foliata, folio subrotundo brevi. *Pluken. amalth. append. t.* 451. *f.* 4.

Leucojum maritimum Nov. hollandicum, folio parvo incano, flore amplo cæruleo. *Pluken. amalth. append. t.* 452. *f.* 4.

Ricinus Nov. hollandicus triphyllos, capsulis eleganter bullatis. *Pluken. amalth. append. t.* 453. *f.* 2.

Umbelliferis adfinis, Ranunculi folio, planta pusilla, Hollandiæ Novæ. *Pluken. amalth. append. t.* 454. *f.* 6.

Rapuntium Novæ Hollandiæ, flore magno coccineo. *Dampier's voyage to new holland,* (*edition of* 1703) *p.* 156. *t.* 2. *f.* 1.

Fucus foliis capillaceis brevissimis, vesiculis minimis donatis. *Dampier's voyage,* 156. *t.* 2. *f.* 2.

Ricinoides Novæ Hollandiæ anguloso crasso folio. *Dampier's voyage,* 157. *t.* 2. *f.* 3.

Solanum spinosum Novæ Hollandiæ Phylli foliis subrotundis. *Dampier's voyage,* 157. *t.* 2. *f.* 4.

Scabiosa forte Novæ Hollandiæ, statices foliis subtus argenteis. *Dampier's voyage,* 157. *t.* 3. *f.* 1.

Alcea Novæ Hollandiæ foliis angustis utrinque villosis. *Dampier's voyage,* 157. *t.* 3. *f.* 2.

Dampier's voyage, 158. *t.* 3. *f.* 3.

Dammara ex Nova Hollandia, Sanamundæ secundæ Clusii foliis. *Dampier's voyage,* 158. *t.* 3. *f.* 4.

Equisetum Novæ Hollandiæ frutescens foliis longissimis. *Dampier's voyage,* 159. *t.* 4. *f.* 1. (Casuarina; but which species, is impossible to determine from such a figure.)

Colutea Novæ Hollandiæ floribus amplis coccineis, umbellatim dispositis, macula purpurea notatis. *Dampier's voyage,* 159. *t.* 4. *f.* 2.

Conyza Novæ Hollandiæ angustis Rorismarini foliis. *Dampier's voyage,* 160. *t.* 4. *f.* 3.

Jan. 20, 1806.

XXXI. *Observations on Orthotrichum and Neckera, together with some other Genera of Mosses.* By Dr. D. M. H. Mohr, *of Kiel.*

THAT ORTHOTRICHUM of Hedwig constitutes one of the most natural genera of mosses, is allowed even by such botanists as think that many of the other Hedwigian genera rest upon too minute characters to be generally admitted;

nevertheless, no genus has occasioned greater trouble to the ablest muscologists, desirous of establishing it on correct and solid characters. The interior peristom is found to vary so much, that from it alone the genus might be divided into three at least; and in those species in which it is complete, or consisting of 16 ciliæ, it perfectly agrees with that of *Neckera*. Even the exterior peristom seems subject to some variation, though, with Mr. Turner, I scarce believe it to be so in reality. For this reason, in forming a generic character, Hedwig and other modern botanists have had recourse to the very extraordinary calyptra, a part of the fructification of mosses otherwise but seldom employed for this purpose. The original species had their calyptra pretty thickly beset with upright hairs, and "*calyptra sursum pilosa*" has therefore been admitted into the generic character, chiefly with a view to distinguish the genus from Neckera. But not to mention that of late a *calyptra sursum pilosa* has been likewise observed in several exotic and European species of the genus *Pterigynandrum*, (so that the Orthotricha without an inner peristom run a risk of being confounded with this genus) many of the tropical Neckeræ have also a calyptra with upright hairs; and what renders this confusion still greater, and almost wholly inextricable, is that the calyptræ of several new discovered Orthotricha are destitute of this pubescence. Mr. Bridel, in his *Muscologia*, and M. Palisot-de-Beauvois, in his *Prodrome de l'Æthéogamie*[*], have therefore referred to the genus Orthotrichum a very great number of species which, in my opinion, do not in any respect belong to it. For we certainly ought (as the celebrated president of the Linnean Society has very justly observed) to adhere closely to the excellent Linnean rule,—*genus dabit characterem, non contra*[†].

In

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[*] Vide Annals of Botany, vol. ii. p. 218.

[†] *i. e.* In the series of natural beings the genera are altogether natural, being

as

In the course of my inquiries respecting these mosses, I, too, have been not a little embarrassed to discover a solid character for the genus Orthotrichum. The exterior teeth I have seen to be either apparently eight or sixteen in number. When there are 16 teeth, each tooth is marked in its middle with one longitudinal streak; when eight, each has three such streaks, dividing the tooth into four equal parts; so that, compared with the others, these eight teeth may, in reality, be regarded as 16 firmly adhering by pairs. In short, the exterior fringe is exactly the same as in Splachnum, where also, if the 16 teeth are observed singly with a good glass, the same longitudinal streak may be seen without much difficulty. In such Orthotricha as have 16 distinct teeth, the interior peristom always seems to consist of an equal number of alternate filamentose ciliæ; in the species where only eight geminated teeth can be distinguished, the interior peristom has also only eight such ciliæ, or these are even entirely wanting *. In the first case, the connexion of the teeth in pairs makes the wanting eight ciliæ, which should otherwise have occupied the interstices between the teeth that now adhere together, quite superfluous for preventing the momentaneous evacuation of the seeds, which is not the case when there are 16 distinct teeth. But in both these cases we find the teeth becoming very much reflected. In the few species where no ciliæ are found, the teeth are not at all reflected, as has been already observed by Hedwig in *O. anomalum*; and, as I may add, also holds good in *O. cupulatum* (a species which, I think, comes very near to *nudum* of Dickson); the too sudden di-

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as given by Nature herself; in the system they must be artificially determined, but, when we shall become true observers, we shall find means to make our genera natural also.

* In *O. obtusifolium*, the ciliæ too, though alternating with the pairs of teeth, seemed to me geminated: but this I do not positively affirm.

spersion of the seeds being by this means prevented without assistance of the ciliæ.

These remarks upon the peristom will serve to show how little essential difference really exists between all the Orthotricha in that respect, however great the diversity may appear at first sight. Certainly, he that would remove those species with half an inner peristom, or none at all, to different genera, would do great violence to Nature.

As to the *Neckeræ*, my friend professor Swartz has observed, in the third volume of his excellent *Flora Indiæ occidentalis* (not yet published), that four of them, viz. *N. filicina, hypnoides, composita*, and *polytrichoides* (Hypnum Hedw.), have a hairy calyptra like Orthotrichum. Several of these species, together with some others, have been united, as well by Mr. Bridel as M. Palisot-de-Beauvois, with the Orthotricha; and the latter botanist has even ventured to establish a new genus, which he calls *Pilotrichum*, and which contains such of the former Neckeræ as have a hairy calyptra. Besides these species, there are others whose calyptra, though destitute of hair, is in form and structure pretty like that of the true Orthotricha. Among these we have the Neckera *cirrhosa* Swartz (Anictangium Hedw.). The internal peristoms of the former species agree with that of the true Orthotricha (as *striatum, rivulare, diaphanum*, &c.). The calyptra of *N. filicina, hypnoides, composita*, I have not yet seen (nor indeed had the great Hedwig); but to judge from the habit of the plants, it is hardly to be believed they can much differ in form and other respects from those of Neck. *heteromalla* and *filiformis* (which agree in this regard with *Bryum hypnoides* L.), or, from the greater part of the Hedwigian Trichostoma, with Grimmia *apocarpa* and its congeners, and Anictangium *ciliatum* and some other species. On this account, I do not apprehend that these Neckeræ will run a great risk of being confounded with the Orthotricha, much less than Neckera *polytrichoides*,

polytrichoides, the very hairy calyptra of which seems to me to agree in form and structure (except in being hairy) with that of Neckera *cirrhosa*, so that in my remarks I may hereafter pass over this with its many congeners both tropical and European.

Upon a closer examination I have found that the *striatæ calyptræ*, as they are called, of all the known Orthotricha, except *O. crispum*, have, when regular, eight longitudinal carinæ, and as many channels between them, as is shown in Pl. xiv. fig. 1 and 2. Every carina at the base of the calyptra splits apart, so as to make the calyptra *basi octofida*. Not unfrequently more than eight carinæ are to be seen, and of course an equal number of divisions; but this I consider rather as irregular: whence, for the sake of perspicuity, I have omitted this deviation in my figures. This structure is easily observed in those calyptræ of the Orthotricha which are naked or destitute of hair; not so easily in *O. anomalum, affine, striatum*, where the numerous hairs, in some measure, conceal the real figure of the calyptra. But if some of the hairs be removed with a fine lancet, particularly at the base of the calyptra, this will appear conformable with that of the other species. (See Pl. xiv. fig. 2.)

Just the reverse of what has here been advanced respecting the calyptræ of the Orthotricha takes place in those of *O. crispum*, Neckera *cirrhosa*, *N. polytrichoides*, and many other mosses. For in these, instead of the *carinæ*, we find *sulci*, or furrows; and instead of the *canales, dorsi*, or ridges, as they are called by modern terminologists, or *canales a supina facie*. If regular, these calyptræ, too, have eight slits at their base, but the divisions are in the *sulci*; which evidently shows that in these calyptræ the *sulci* answer entirely to the *carinæ* in the others (see the figure). More than eight sulci and as many slits are also sometimes to be seen here, which, as I stated above, seems to me to be a deviation from the general rule not worth regarding*. But whatever number of slits are found in either calyptra, these are always in the carinæ in the Orthotricha, and in the sulci in the other mosses. From what has been stated I may venture to propose the following new character for the genus *Orthotrichum:*

Peristomium exterius subsedecim-dentatum, *interius* variabile aut nullum. *Calyptra* carinato-canaliculata, carinis basi fissa;

as also to submit to the examination of abler botanists, particularly to such as have an opportunity of examining a great number of exotic mosses †, another genus with this character:

Peristomium exterius sedecim-dentatum, *internus* ut in Orthotricho. *Calyptra* sulcato-dorsata, sulcis basi subpartita.

I shall now add a few remarks on the genus *Orthotrichum*, and its principal character derived from the calyptra, which, I think, will keep the true Orthotricha distinct from all the mosses known to me (which are the greatest part of those already described, and many hitherto undescribed). For, a calyptra like that of the Orthotricha appears to occur only in both the species of *Tetraphis* (*ovata* or *rigida*, and *pellucida*), with which certainly no botanist will ever confound our genus; and in a new tropical moss in my collection, quite distinct, by very many characters, from all the known genera. With regard to the peristom, the Orthotricha that want the inner one can only be confounded with such Pterigynandra as have a hairy calyptra, or with Splachnum, or those species of Didymodon of Hedwig the teeth of which are only 16 in number. The teeth in these latter, however, approximate, and even in some degree adhere, by pairs, and are not, as in the Orthotricha and Splachna, placed at equal distances. Besides this, the Didymodontes have not only a smooth calyptra, but at the same time one that bursts on one side, and separates obliquely (*calyptra dimidiata s. cucullata, oblique secedens*). The Splachna, which, as I have already mentioned, perfectly agree in the peristom, have also a smooth calyptra, but which separates perpendicularly, and is also of a very extraordinary shape (see fig. 7.). Finally, as to the Pterigynandra with a hairy calyptra, this too is smooth, and, as I think, separating obliquely, with the exception, perhaps, of Pterig. *trichomitrion*. In a synopsis of the genera of mosses it will, therefore, be sufficient to mention those Orthotricha that have but one peristom at the end of the single-fringed genera, with the addition of an asterisk, according to the rule of Linnæus.

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* I have nevertheless thought proper to express this circumstance in two figures, which, with the assistance of the segments, that are always an eighth part of the calyptra, may be clear enough.

† Certainly no author who has seen individuals of an extensive set of natural beings from one country only, should be positive as to generic characters.

As for the second genus above proposed, I fear only that such botanists as have not seen many of the exotic species (of which I have in my possession, or have seen, near a dozen, for the most part non-descript), will think the removal of Orthotrichum crispum from its hitherto supposed congeners unnatural, and in contradiction to the rule I myself have acknowledged in the beginning—*genus dabit characterem*, &c. Let me therefore here remind the reader of the names and specific characters by which the late Ehrhart distinguished the three original Orthotricha, viz. *anomalum*, *striatum*, and *crispum*. The two first this excellent botanist called Weissia *ithyphylla* minor et major; the third, Weissia *ulophylla*, (from ἰθυς *rectus*, *strictus*,—and οὐλος *crispus*,) distinguishing the former by "foliis arefactione immutabilibus," the latter by "foliis arefactione crispis." The much-admired talent of the author for assigning to his plants the most significant names, appears to me particularly striking in this instance. For, if we subscribe to what Mr. Turner, in his elegant Muscologia Hibernica, says of the Orthotricha*, (as, with this one exception, we certainly ought to do,) we must exclude the Orthotrichum *crispum* from the genus. All the other species have what are called *folia stricta*, and this alone has *folia crispata*; the remaining species are in reality so closely allied, that, if all the other genera of mosses should ever be settled in a like natural manner, I should consider the system of mosses as the triumph of botany. *O. crispum* alone refuses to unite with the genus. Perhaps muscologists will be the better reconciled to my new proposed genus, from the consideration that it is no less natural than the Orthotrichum itself with respect to the nature of the leaves, which is so striking in that genus, as to require, if possible, the separation of the species *crispum*. For all the species I have hitherto seen of my genus are *ulophyllæ*, as Ehrhart would call them, or have their leaves "arefactione crispa." As for their habits, mode of growth, ramification, native places on trees, the general appearance of the calyptra, capsula, seta, and operculum (recte rostratum), and even the peristom, they only resemble, of all the known mosses, those species of Orthotrichum, from which they hardly differ, except in the crispation of the leaves, and the structure of the calyptra when more attentively examined. They have therefore both the requisites which I think necessary for the establishing of a genus, that of being both natural and systematic. Following, therefore, the footsteps of Ehrhart, who, without being aware of the artificial character of my genus, has, in his trivial name and diagnosis of Weissia *ulophylla*, expressed its natural character, I shall derive my denomination from the same circumstance of the crisped leaves, and propose the name of ULOTA, formed from the very word made use of by Ehrhart (*οὖλος, crispus*).

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* "Orthotricha, si crescendi modus habitusque respiciantur, natura arctissime inter se connexa et tam vere sui generis videntur, ut potius ejusdem stirpis varietates, quam distinctæ species, primo intuitu censerentur."

I might subjoin here a list of the species both of *Orthotrichum* and *Ulota:* this I shall reserve for another opportunity, as I wish first to hear the judgment of botanists upon what is above proposed; I shall therefore only add a few remarks which more immediately concern the elucidation of my genera, particularly the latter of them. As in Orthotrichum, so in Ulota, the calyptra is either hairy or not; for the most part, as it seems, not hairy. For (unless Neckera *filicina, hypnoides,* and *composita,* belong to my genus, which I hardly think,) of all the species which I know, only the two that will stand at the head of the genus, viz. Neck. *polytrichoides* and Ortho.* *crispum,* have a hairy calyptra; in all the rest it is quite bare. With this, I think, will range hereafter, besides Neck. *cirrhosa* and many others, the Orthotricha *angulosum, breve, fimbriatum, pallidum α. β. γ.,* and probably also *coarctatum* and *plicatum* of M. Palisot de Beauvois. But this author has not sufficiently determined his species; and this, whilst it affords the principal reason why I at present decline enumerating the species of Ulota, makes it impossible to speak with certainty of his plants. The peristom of these mosses, though not well ascertained in every species, seems to correspond extremely well with that of Orthotrichum, and is probably liable to as many and the same variations. If we may trust the French ætheogamist, all his species, in this part, totally agree with the genuine Orthotricha. The peristom of Neck. *polytrichoides,* according to Dr. Swartz, who without doubt observed it very well, has 16 teeth and as many cilia. To Orthotrichum *crispum* are given by Hedwig also 16 teeth, somewhat conglutinated by pairs, and likewise 16 cilia; but, as for the latter part of this assertion, I cannot refrain from quoting Dr. Smith's words: " internum e ciliis 8, nec apud nos pluribus." I myself never saw more, nor do I think more wanting according to the rule above mentioned,—that, if ever the teeth are connected together so as to make eight pairs (which is truly the case in this species), a cilium is only found between every pair to prevent the seeds from being too speedily evacuated. Should an Orthotr. *crispum* with 16 cilia be met with hereafter, the teeth may also be found to be 16 distinct ones, and it is probable this moss will prove a species sui juris. Of Neck. *cirrhosa*, Swartz has not seen the inner fringe, nor have I had, or could expect to have, better luck. But in another elegant species, evidently of this genus, and brought from the river Oronoko by Mr. Humboldt, I find the exterior peristom consisting of 16 teeth, somewhat connected by pairs, and each having in its middle the same longitudinal furrow obvious in all the Orthotricha and Splachna. When dry (which is very singular), the pairs of teeth are not, as is usual in these genera, *reflexi*, but *spiraliter revoluti*. The inner peristom evidently consists of filamentous cilia, which, I think, will be found to be quite of the same number and nature, as I shall afterwards describe more at large in the supposed Neckera *torta*. Be this, however, as it may, the above-mentioned circumstances will, I hope, be sufficient to prove the conformity of the peristom of the Ulotæ with that of Orthotrichum in general. In Mr. Humboldt's moss from the Oronoko, and perhaps two or three species more, I observed the capsule *furrowed*, as it is in the Orthotrichum. For this reason I can hardly agree with the character of the latter genus proposed by Messieurs Smith and Turner, which is chiefly founded upon this circumstance of the Orthotrichum-capsules. I cannot help expressing, in general, my doubts of the propriety of having recourse to the form and structure of the capsules of mosses in forming their generic characters, as it will oblige us at length to divide the Polytrichum and other genera into several new ones, and to make more such unnatural alterations; but, with respect to Orthotrichum and Ulota, this particularity must absolutely be neglected, as it would, if attended to, oblige us to separate two genera out of the latter at least.

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* Of this I have a variety, from Isle de Bourbon, with leaves somewhat longer and a capsule more oblong. Its size is also smaller, but I hardly believe it specifically distinct.

There is another singular tropical moss, which has the same calyptra with Ulota, viz. Encalypta *crispata* of Thunberg (see fig. 5.). This species, I am confident, has only one peristom, and that of 16 non-geminated teeth, though the habit of the plant and the curled leaves are quite the same as in the other Ulotæ; but though I hardly doubt but that many of the other species, which I now consider to belong to this genus, and particularly what I take to be M. Beauvois's Orthotr. *pallidum*, may hereafter be found to want the cilia, I will not positively affirm that the Encalypta *crispata* is an anomalous Ulota, as Orthotr. *anomalum*, *cupulatum* and *nudum* are in their genus. I rather leave it to Dr. Swartz and other eminent botanists, to determine whether or not it be proper to unite under one genus all those species whose calyptræ are like that of the Ulotæ. The Trichostomum *polyphyllum* Turn., too, has the very calyptra of the Ulotæ, differing entirely in this part of its fructification from the rest of the genus, as it does also in its crisped leaves from the habit of *Bryum hypnoides*; a character in which it comes near the Ulotæ. Another moss, *Bryum Daviesii* Dicks., which I long extremely to see complete specimens of, according to the figure of Mr. Dickson, and the descriptions of Smith and Turner, seems to resemble much the Ulotæ as well as in its leaves as calyptra; and as I am pretty sure its peristom consists of 8 geminated teeth, I can scarcely think it well united either with

Encalypta or Grimmia; two genera, in my opinion, ever to be kept separate, though my friend Dr. Turner is inclined to join them.

It still remains for me to show, that by the structure of the calyptra, both genera, Ulota and Orthotrichum, are equally distinct from the rest of the Neckeræ, with which they agree in general as to the peristom. Though M. Beauvois, one of those botanists who have first applied the calyptra more extensively for distinguishing the genera of mosses, seems to attribute generally to all former Neckeræ what he calls a calyptra campanulata (see his corrections at the end of the table of Lycopodia), yet I can affirm that at least three widely distinct forms of calyptræ occur in this genus, (for I have not yet seen the Racopilæ of this author, and will therefore not be positive in ascribing to them the same calyptra with Neck. *heteromalla*, &c.) All the species "foliis bifariam imbricatis," as *crispa*, *pennata*, and others, and moreover N. *cladorhizans*, *seductrix*, *viticulosa*, *curtipendula*, and some new ones, have shown me a calyptra dimidiata, suboblique secedens (see Hedwig's *Stirpes*, vol. iii. t. 19. f. 10, and my fig. 9.); so that I must look upon the arrangement of the species in M. Beauvois's genera, Neckera and Pilotrichum, as very improper and quite unnatural. The Neck. *filiformis* and *heteromalla*, with a tropic variety of the latter, have the same calyptra with *Bryum hypnoides* and *apocarpum* α. β. of Linnæus (see my fig.); and with this, as I judge from its habit, will agree (except in the hair) N. *filicina*, *hypnoides*, *composita*. Finally, an extremely beautiful moss, which I take to be the real Neck. *torta* of Swartz, or Hypnum *torquatum* of Hedwig, has a calyptra like that of the true Encalyptæ, but regularly divided at the base into 8 segments. This moss is also very singular for its peristom, which consists of 16 teeth somewhat connected by pairs, and each having a longitudinal groove in its middle, and as many opposite cilia divisible into 32 filiform crura. When the peristom becomes dry, the teeth instantly appear spiraliter revoluti, as in the Ulota from the Oronoko above mentioned, with which I think the moss will, as to the peristom, completely agree. The cilia often adhere so closely to the teeth as to be for the most part rolled up with them. Even with respect to the sex, this moss and all the Ulotæ agree; all having their male flower axillary, their female one terminal; so that in this regard, too, they better agree with the Orthotricha than with the rest of the Neckeræ.

It is not at present my business to determine whether the different shape and structure of the calyptra in all those Neckeræ will prove sufficient to arrange them under different genera, which, indeed, I am aware would give us some more natural genera out of one rather unnatural. I am contented here with having, as I think, satisfactorily shown that none of the other Neckeræ have either a carinated calyptra, like Orthotrichum, or a sulcated one, like Ulota. All of them can be kept distinct from these genera by a calyptra lævis.

I might here dismiss the subject, had I not something to propose to botanists with respect to the genera Anictangium and Gymnostomum, Grimmia and Weissia, Dicranum and Trichostomum. With most modern authors, I cannot help rejecting the Hedwigian characters of all these genera, as being principally founded upon their flowers. Nevertheless, in many respects the genera are natural, and, I think, might become more so if distinguished by their calyptræ. I should therefore ascribe a *calyptra mitræformis (subdimidiata) basi inæqualiter laciniata, oblique secedens* (such a one as occurs in Neckera *filiformis* and *heteromalla;* see fig. 8.) to *Anictangium, Grimmia* and *Trichostomum*, and a *calyptra cucullata s. dimidiata (basi subintegra) oblique secedens* to *Gymnostomum, Weissia* and *Dicranum*, and arrange the species certainly known to me as follows:

ANICTANGIUM

ANICTANGIUM

acaule n. sp., pulvinatum (Gymn. Hoffm.), decipiens n. sp., ciliatum Hedw., ? filiforme Michaux, aquaticum Hedw.

GYMNOSTOMUM

cæspiticium n.sp., lapponicum Hedw., curvirostrum Hedw., stelligerum Brid., rupestre Schleich. n. sp., ? luteolum Smith., ? pennatum Hedw., ovatum Hedw., truncatum Hedw., mucronulatum Hedw. fil. n. sp., japonicum Hedw., microstomum Hedw., rutilans Hedw., trichodes Web. fil., tenue Schrad.

GRIMMIA

canescens Schleich. n. sp., Donniana Smith., apocarpa Hedw., stricta Turn., rivularis Brid., pilifera Pal. de Beauv., alpicola Swartz, maritima Turn., cribrosa Hedw., plagiopodia Hedw.

WEISSIA

parasitica (Encal. Swartz Fl. Ind. occ.), controversa Hedw., microodonta Hedw., crispula Hedw., cirrata Hedw., curvirostra Hedw., verticillata (Grimm. Turn.), lanceolata (Encal. Hedw.), heteromalla Hedw., starkeana Hedw., aciphylla Wahlenb. n. sp., pusilla Hedw., Seligeri n. sp., calcarea Hedw., trifaria Brid. n. sp., fugax Hedw., schisti, recurvata (Grimm. Hedw.), acuta Hedw., nigrita Hedw., nuda (Grimm. Smith.).

TRICHOSTOMUM

pulvinatum α. β. (Fissid. Hedw.), ovatum (Dicran. Hedw.); ellipticum (Dicran. Turn.), aciculare, α. β. (Dicran. Hedw.) riparium (Gymnost. Host Syn. austr.), microcarpum Hedw., heterostichum Hedw., lanuginosum Hedw., canescens Hedw., ericoides Schrad., fasciculare Schrad., affine Schleich. n. sp., patens (Dicran. Smith.), sciuroides (Fissid. Hedw.), fontinaloides Hedw.

DICRANUM

Viridulum Swartz, incurvum (tamarindifolium Turn. et Smith.?) palmatum (Fiss. Hedw.), osmundoides (Fiss. Hedw.), adiantoides Swartz, polypodioides (Fiss. Hedw.), subbasilare (Fiss. Hedw.), taxifolium Schrad., asplenioides (Fiss. Hedw.), semicompletum (Fiss. Hedw.), glaucum Hedw., glaucum (pumilum) Michaux, saxicola n. sp., introflexum Hedw., capitiflorum Pal. de Beauv., filiforme Pal. de Beauv.?, flexuosum Hedw. cum β. frag. et γ. pilif. Turn., strictum Schleich. (Scottianum Turn.), alpinum (Sphagnum Linn., non Dillen.!), ? flavescens Turn., longifolium Ehrh., flagellare Hedw., scoparium Hedw., majus Smith., fuscescens Turn., dichotomum (Cecalyph. Pal. de Beauv.), undulatum Ehrh., lycopodioides Swartz, Schraderi n. sp., densifolium n. sp., calycinum (Weiss. Hedw.), perichætiale (Cecalyph. Pal. de Beauv.), spurium Hedw., montanum Hedw., polycarpum Ehrh., strumiferum Ehrh., virens Swartz, squarrosum Schrad., pellucidum Swartz, gracilescens n. sp., Schreberi Swartz, xanthodon Hedw., pygmæum Swartz n. sp., crispum Hedw., rupestre n. sp., varium Hedw., rufescens Turn., rigidulum Swartz, Starkii n. sp., falcatum Hedw., heteromallum Hedw., orthocarpum Hedw., curvatum Hedw., subulatum Hedw., interruptum Brid., cerviculatum Hedw., flavidum Swartz n. sp., pusillum Hedw., ambiguum Hedw. (cui accedit Trematodon longicollis Michaux), pallidum (Trichost. Hedw.), strichum (Trichost. Swartz Fl. Ind. occ.), tortile (Trichost. Schrad.), tenue (Trichost. Hedw.), curtum (Barbula Hedw.), purpureum Hedw., intermedium Hedw., Celsii Hedw., purpurascens Hedw., cylindricum (Trichost. Hedw.), orientale (Trichost. Web. fil.), latifolium Hedw.

From what has been said the reader will be able to judge whether the natural affinities of the several species have been improved or impaired by my arrangement.

Kiel,
1st of March, 1806.

Explanation of Plate XIV.

Fig. 1. Calyptra Orthotr. *diaphani* Schrad. with a lacinia ad latus.
2. ——— ——— *anomali* Hedw.
3. ——— of a moss nearly related to Anictang. *cirrhosum* Hedw. (Neckera Swartz.)
4. ——— of an Ulota from the Oronoko.
5. ——— of Encalypta *crispata* Thunb. and Hedw.
6. ——— of Orthotrich. *crispum* Hedw.
7. ——— of Splachnum *tenue* Dicks.
8. ——— of Neckera *heteromalla* Hedw.
9. ——— of M. Beauvois's Pilotrichum *truncatum*, which I think the same with Neckera *disticha* of Swartz and Hedw.
10. ——— of what I suppose to be Hypn. *torquatum* Hedw. or Neckera *torta* Swartz.
11. Capsule of the same moss with the peristom in its moist state. *a*. One of the teeth.
12. The peristom, when dry. The eight teeth of one half are rolled backwards, and the eight opposite pairs of cilia erect.
13. Operculum.
14. One of the leaves.

All The figures are more or less magnified.

P. S. I have this moment received from my friend Prof. Swartz the calyptra of Neck. *composita*, and, contrary to my expectation, find it to be the same with that of Neck. *polytrichoides*, or, as in all *Ulotæ*, sulcato-dorsata.

XXXII. *Descrip-*

XXXII. *Description of the Rush-leaved Lygeum,* Lygeum Spartum *Linn. by* M. Richard*.

Of all the known grasses the *Lygeum Spartum* has the largest flowers, and of course the easiest to be examined; but, notwithstanding this, there is scarcely any with regard to which describers have fallen into so many serious errors.

Löffling first gave a botanical description of this plant, which, being adopted by Linnæus, has been closely copied by all subsequent writers who mention it; and hence the generic character is equally defective in all. Such errors, when propagated in works of deserved repute, are the more injurious to the progress of the science, as, by thus wearing the mask of truth, they either mislead or deceive the eye of the observer. It is probably from this cause that it now falls to my lot to give the first true characters of a plant so well known and so easily obtained as *Lygeum Spartum*.

Description.

Root perennial, fibrous. Plant growing in tufts.

Culms simple, straight, firm, cylindrical, smooth, shining, solid, from twelve to eighteen inches high; generally only one knot visible, from which issues the last leaf.

Leaves close at the lower part of each culm, seldom fewer than four in number; sometimes shorter sometimes longer than the culm; either straight or variously recurved, firm, cylindrical, the inner surface marked with a groove, which disappears in drying, gradually tapering into a very fine and stiff point; smooth, of a whitish-green colour: the last distinct and distant from the others.

Sheaths enveloping the lower part of the culm, sheathing one another successively, much lengthened out, terminated by a membranous linear stipule (ligula), behind which is a very fine down. That of the last leaf, more dilated,

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* Mémoires de la Société d'Histoire Naturelle de Paris, p. 28.

lated, sometimes sheaths the whole peduncle, and even part of the involucre of the flower.

Involucre. The top of each culm terminated by a knot serves as a peduncle to a solitary foliaceous involucre, of a greenish colour, and delicately striped with green longitudinal lines, straight, about two inches long, rounded at its base, tapering insensibly upwards, nearly spindle-shaped, terminated internally by a membranous stipule, and externally by an awn-shaped point, closed by the involution of its margins, but affording a passage at its summit to the stamens and stigmas.

Flowers. The involucre (A.) incloses two flowers (B.) lying side by side the whole of their length, which is nearly equal to that of the involucre; clothed at their common base with a dense covering of long silky white hairs.

Glumes. Two unequal membranous pale *valves:* the *exterior* (C. D. 2.) embracing the inner, linear-lanceolate, very pointed, carinated, carina marked with a green streak, and each side near the base with a blueish-white spot; the *interior* (C. D. 3.) double the length, narrow, straight, its outer surface (D. *a.*) flat, inner (D. *b.*) somewhat two-sided from the inflexion and convergency of the two margins, and split at the top into two sharp slender points.

Tube. The glumes of each flower unite at their bases upon a common receptacle; very downy (C. 1.), oblong-top-shaped (D. 1.), rather contracted at the top, and tapering towards the base, which is lengthened out into a short slender peduncle. This receptacle is tubulated and bilocular (F.): a transverse section (G.) shows that its external part is formed by the uninterrupted coalition of the two outer valves (D. 2.), and that the two inner valves (D. 3.) not only constitute the septum, but also line the whole internal surface by means of the conflux of their margins. This observation proves that this tube, peculiar to the genus Spartum, and unknown in any other of the gramineæ, is an integrant part of the glumes.

Stamens three. *Filaments* (E 2.) inserted in the bottom of each loculament of the tube (E. 1.) below the ovary, at the side of the exterior valve (E. 4.); received, on their exit from the tube, by the exterior valve (C. 3.), which they much exceed in length; setaceous, a little compressed, with obtuse margins, at first straight, but the exserted part becoming afterwards variously curved.

Anthers (C. 4.) purple-coloured, from ten to twelve lines long, two-thirds of a line thick, nearly prismatical, marked with four grooves, split at both ends into two sharp-pointed acuminated teeth; those at the lower extremity larger, divaricate; they burst at each lateral groove into two margins, which become undulated (C. 5.). The *pollen* is sulphureous, consisting of oblong-elliptic bodies (H.) sometimes regularly, at other times irregularly, transparent.

Pistil. Insertion and situation (E. 3.) the same as those of the filaments. *Ovary* supported by a very small receptacle common to it and the stamens, not to be distinguished from the style but by holding it up to the light, when it is defined by a slight shadow; it is oblong, triangular, tapering towards the base, and lengthened without interruption into a long, thickish, stiff *style,* which is rather triangular at the lower part, flattened as it ascends, and insensibly hollowed into a slight groove running along the stigma. The *Stigmo*, flat-exserted, is only a simple and delicate prolongation of the style, and receives the pollen on its two margins, which are glandulous.

FRUIT. The involucre (I.) more or less reflected, bursts on the lower side almost the whole of its length to permit the exit of the fruit, which at first appears like a bundle (K.) of long light-brown hairs. These hairs cover entirely, as in the flower, the above-mentioned *tube,* now much increased,

creased, oblong, cylindrical, tapering at its base into a short peduncle, slightly contracted at the top and crowned with the dry shrivelled glumes (L.). This tube, becoming cartilaginous, now resembles a bilocular *pericarp* (M.), including in each cell a seed (N.) which, in conjunction with a persistent portion of the filaments of the stamens, exactly fills the cavity.

SEED oblong, nearly linear, terminated by a sharp point, a little compressed: the outer surface (O.) slightly convex, the inner (P.) flattened and marked in the middle by a deepish longitudinal groove; sides obtuse. At the base of the outer side is an orbicular *areola* (Q.) occupying nearly the fifth part of its length, depressed into a groove at the circumference, and raised in the middle by an oblong protuberance.

Integument. A red-brown, thin, membranous pellicle, closely adhering, except at the areola, where it may be easily separated.

Perisperm of a firm and farinaceous substance, very white, conform with the seed, but without point.

EMBRYO. The areola (Q.) at the base of the outer side indicates the place of the embryo, which is covered externally only by the common integument of the seed. It is oblong, cylindrical, white, of a single uniform piece, and vertically adnate the whole length of its inner side, with a slightly depressed disk, which the embryo nearly equals in length, but occupies only a third of its breadth. This disk, though making a part of the farinaceous matter, is still distinguishable from it by a more horny consistence and yellowish colour.

OBSERVATIONS.

1. Sometimes the floral involucre includes three flowers, in which case the tube is trilocular, &c.

2. The flowering time of this plant, at Paris, is the month of May.

3. The floral involucre is a terminal leaf, the sheath of which is considerably dilated at the expense of its foliaceous part, which is now reduced to a short awn-shaped point.

4. It is thus evident that what botanists (with the exception of Adanson) have considered as an *inferior ovary common to two glumes*, is nothing but a tube formed by the coalition of the latter. This inferior ovary being done away, and the insertion of the stamens and pistil at the bottom of the tube demonstrated, the distance which appeared to subsist between the *Lygeum Spartum* and the other grasses is much diminished, and reduced to the coalition of two or three glumes into a bi- or tri-locular tube. The valves of some other grasses, indeed, are united at their bases, but none in so very remarkable a manner.

5. The fruit of *Lygeum Spartum* is no more a *nux* than that of other genera of the same natural order: here the seed is enveloped only by the tubular base of the glumes, whereas in general it is surrounded by the whole of the glume.

6. As a stable generic character can only result from the comparison of several species, I shall here only give a sketch of that of *Lygeum Spartum*, being the only species hitherto known.

Characteris generici LYGEI *reformatio.*

Involucrum oblongum, teres, convoluto-clausum, genitalia tantum exserens summitate.

Flores isto inclusi, bini: glumis ima parte in tubum villosissimum, bilocularem concrescentibus.

Gluma tenui-membranacea: bivalvis, *exteriore* lineari-lanceolata, acutissima, carinata, amplexanti-incumbente; *interiore* duplo longiore, angusta, extrorsum plana, introrsum marginibus inflexis clausa, apice acute bifida.

Stamina tria: *filamenta* fundo singuli loculi inserta, a valva interiore excepta, promisse exerta. *Antheræ* angusto-longissimæ, utroque apice acuminato-bidentatæ.

Pistillum situ staminum: *Germen* vix a stylo distinctum, oblongum, subtriquetrum, continue promittitur in *stylum* longissimum, desinentem in *stigma* longe exertum, flexuosum, sensim tenuissimum, levissime canaliculatum, glabrum.

Pericarpium, spurium, a tubo glumali villosissimum, oblongum, teres, cartilagineum, includens in singulo loculo

Semen lineari-oblongum, mucronatum, extrorsum convexum; areola basilari orbiculata, in ambitu sulcato-depressa, in medio oblongo-protuberante: introrsum planiusculum, sulco longitudinali exaratum.

Discus embryonifer suborbiculatus, quintam longitudinis nuclei partem occupans.

Embryo verticalis, rectus, oblongus, uniformiter teres, longitudine illius disci.

N. B. Interdum flores intra involucrum tres; tunc tubus trilocularis, &c.

XXXIII. *On the Characters of a distinct Genus hitherto confounded with Ornithogalum, and called* GAGEA; *with some Remarks on the Importance of the Inflorescence in distinguishing Genera. By* R. A. SALISBURY, *F.R.S. &c.*

In distinguishing many genera of the vast natural class of Monocotyledonous Vegetables, it appears to me that the *inflorescence* is a character of primary importance; and I have little doubt that in future ages botanists will pay more attention to it than they have done hitherto, in all genera whatsoever.

Linné was fully sensible of its great weight; but having prescribed to himself for a law, that his genera should depend solely on the fructification, he very artfully introduced it among his characters under the feigned name of Calyx, or Receptaculum: for his Involucrum, Amentum, Spatha, Gluma, Palea, Umbella, Cyma, and Spadix, are in truth neither more nor less than so many different kinds of *Inflorescence.* Various modifications of it perpetually occur in the same genus, and afford excellent marks of specific difference; but we seldom find a real spike and corymb, fascicle and panicle, umbel and raceme conjoined.

I will now quote some examples of genera nearly allied, but which have a very different inflorescence. Panicum and Digitaria, Zea and Coix, Typha and Sparganium, Schœnus and Cyperus, Calamus and Nipa, Alisma and Butomus, Pitcairnia and Bromelia, Musa and Heliconia, Canna and Amomum, Iris and Gladiolus, Wachendorfia and Philydrum, Melanthium and Colchicum, Polianthes and Dorianthes, Asparagus and Dracæna, Pollia and Convallaria, Allium and Ornithogalum, Eucomis and Massonia, Hæmanthus and Amaryllis, Begonia and Hydrocharis, Protea and Roupala, Dais and Gnidia, Cyclamen and Dodecatheon, Datura and Nicotiana, Atropa and Solanum, Retzia and Convolvulus, Dichondra and Heliotropium, Lantana and Spielmannia, Origanum and Thymbra, Monarda and Collinsonia, Capraria and Browallia, Ledum and Clethra, Pyrola and Epigæa, Campanula and Phyteuma, Lobelia and Jasione, Calendula and Arctium, Scabiosa and Valeriana, Coffea and Gardenia, Hamelia and Nauclea, Vinca and Nerium, Gentiana and Lisianthus, Angelica and Eryngium, Thalictrum and Anemone, Actæa and Podophyllum, Chelidonium and Bocconia, Capparis and Cratæva, Parnassia and Reseda, Cardiospermum and Sapindus, Melia and Turræa, Dictamnus and Diosma, Adoxa and Chrysosplenium, Fuchsia and Epilobium, Myrtus and Melaleuca, Eugenia and Plinia, Lythrum and Lagerstrœmia, Bauhinia and Cercis, Euphorbia and Mercurialis, Morus and Broussonetia, Betula and Fagus, Abies and Taxus.

In the genus which I am now going to establish, this character of the Inflorescence, if there was no other, distinguishes it from all the neighbouring genera with an hypogynous corolla; or, to use the Linnæan phraseology, germen

men superum. Several species of it are already described under Ornithogalum, with which they neither agree in habit nor fructification: in a truly natural series, I believe they must follow Hypoxis; but that genus has a tuberous root, and germen inferum. I presume, therefore, to call them after a botanist who is indefatigable in collecting rare European plants, Sir Thomas Gage, Bart. F.L.S. and whose liberality in distributing them places his name very high among those of his contemporaries.

GAGEA. Petala 6, extus herbacea. Filamenta basi petalorum adnata, angusta, planiuscula. Pericarpium superum, 3-loculare, 3-valve, petalis post florescentiam diu vegetis obductum. Stylus in plerisque clavatus. Semina parva, numerosa, subrotunda. *Plantæ gramineæ facie* Hypoxidum. *Radix parva, bulbosa. Folia pauca, obtuse mucronata, plus minus villosa. Flores lutei, corymbosi. Pedunculus angulatus, plus minus decompositus ramis sæpius brevisissimis pedicellis longis. Bracteæ ad ramos solitariæ præter alias interdum inferius sparsas, foliaceæ. Genus antea cum* Ornithogalo *confusum, in quo corolla cito marcescit et inflorescentia longe diversa. Huc referendæ*

* *Pedunculo inferne nudo*

Fascicularis.

G. corymbo multifloro: pedicellis fasciculatis: petalis elliptico-lanceolatis.

O. luteum. *Smith in Engl. Bot. n.* 21. *cum Ic.* O. sylvaticum. *Persoon in Neue Ann.* 5. *p.* 7. *t.* 1. *f.* 1. O. luteum. *Ray Syn. ed.* 3. *p.* 372. Bulbus sylvestris. *Fuchs. Hist. Pl. p.* 169. *cum Ic.*

Sponte nascentem juxta *Greta Bridge* dumetis, legit H. Johnson: prope *Woodstock* ad margines sylvarum legit J. Banks, baronettus: haud procul a *Tübingen* umbrosis, legit L. Fuchs.

Ludit numero bractearum sæpius duarum, interdum autem corymbo magis decomposito 5—8 adsunt.

Bracteolaris.

G. corymbo multifloro: pedicellis solitariis: petalis lanceolatis.

O. pratense. *Persoon in Neue Ann.* 5. *p.* 8. *t.* 2. *f.* 1. O. luteum. *Schmidt Fl. Bohem. n.* 337. O. luteum. *Roth. Fl. Germ. v.* 1. *p.* 150. *et* 2. *p.* 394. O. luteum. *Fl. Dan. t.* 378. O. luteum. *Linn. Sp. Pl. ed.* 2. *p.* 439. O. pallido flore. *Clus. Hist. Pl. lib.* 2. *p.* 188. *cum Ic.* Pyrrochiton. *Renealm. Sp. p.* 90. *cum Ic.*

Sponte nascentem juxta *Upsala* lupuletis, legit C. Linné: in *Sachsen* abunde pratis et ad sepes, legit A. G. Roth.

Hanc non vidi: unam eandemque cum præcedente vix credam

Stellaris.

G. corymbo multifloro, laxiusculo: petalis argute lanceolatis: pericarpio brevissimo, suborbiculari.

O. arvense. *Persoon in Neue Ann.* 5. *p.* 8. *t.* 1. *f.* 2. O. minimum. *Schmidt Fl. Bohem. n.* 338. O. minimum. *Roth. Fl. Germ. v.* 1. *p.* 150. *et* 2. *p.* 394. O. minimum. *Leers Fl. Herb. p.* 84. O. minimum. *Linn. Sp. Pl. ed.* 2. *p.* 446. Stellaris arvensis fl. lut. &c. *Dill. Giss. p.* 38. O. bulbiferum, &c. *Column. Ecphr. p.* 324. *cum Ic. duabus.*

Sponte nascentem juxta *Upsala* rarius lupuletis, legit C. Linné: in *Sachsen* ubique agris, legit A. G. Roth.

Flores aurei secundum *Leers.*

Spathacea.

G. corymbo 1—4-floro, laxiusculo: bracteis exterioribus grandibus spathaceis: petalis spatulato-lanceolatis.

O. Heynii. *Roth. in Roem. Arch.* 3. *p.* 42. O. spathaceum. *Heyne in Neue Ann.* 15. *p.* 11. *t.* 1. O. luteum. v. β. *Roth. Fl. Germ. v.* 1. *p.* 150. *et* 2. *p.* 393. O. pusillum. *Schmidt Fl. Bohem. n.* 339. O. minimum. *Fl. Dan. f.* 612.

f. 612. O. Pannon. luteo flore. *Clus. Hist. Pl. lib.* 2. *p.* 189.

Sponte nascentem prope *Hamburg* nemoribus humidiusculis, legit F. G. Heyne: in *Westphalen* copiose, legit C. Trentepohl: circa *Prag* collibus apricis, legit F. W. Schmidt.

** *Pedunculo a basi bracteis foliato*

Pygmæa.

G. corymbo 1-floro, rarius 2—6-floro: bracteis foliis latioribus: petalis ovali-lanceolatis apice incrassatis.

O. bohemicum. *Willd. Sp. Pl. v.* 2. *p.* 113. O. bohemicum. *Schmidt Fl. Bohem. n.* 336. O. bohemicum. *Zauschn. in Abhand. Bohem. v.* 2. *p.* 121. *cum Ic.*

Sponte nascentem juxta *Prag* locis saxosis udis, legit J. Zauschner: prope *Konigssaal* copiosissime legit F. W. Schmidt.

Petala non æqualia, ut vult Willdenow. An eadem cum O. Fibroso *Desf.*?

Bulbifera.

G. corymbo 1—3-floro: bracteis angustis, basi bulbiferis: petalis elliptico-lanceolatis: antheris retusiusculis.

O. bulbiferum. *Linn. Suppl. p.* 199. O. bulbiferum. *Pall. Reise, v.* 2. *app. n.* 106. *t.* O.

Sponte nascentem in regionibus australibus fluminum *Volga* et *Jaik*, solo nitroso arido legit, P. S. Pallas.

Reticularis.

G. corymbo 1—3-floro: bracteis angustis: petalis exterioribus longioribus, valde acuminatis.

O circinatum. *Linn. Suppl. p.* 189. O. reticulatum. *Pall. Reise, v.* 3. *app. n.* 85. *t. D. f.* 2.

Sponte nascentem prope *Astrachan* deserto nitroso arido, tardiusque florentem O. *Luteo* et *Bulbifero* ibidem vulgaribus, legit P. S. Pallas.

Antheræ in hac evidenter acuminulatæ.

XXXIV. *Third Memoir on the general Characters of Families of Plants, derived from the Seeds, as confirmed or corrected by the Observations of Gærtner.* By A. L. de Jussieu *.

In this memoir, conducted on the same plan as the two former†, we proceed to run over the families of plants having a monopetalous corolla inserted into the calyx. The natural orders marked by this insertion are: the Ebenaceæ or Guaiacanæ, the Rhodoraceæ or Rhododendra, the Ericineæ or Ericæ, and the Campanulaceæ. All of them contain genera that have been the subject of detached observations; which collected together will lead to general conclusions, and some of them will furnish particular exceptions. These observations will be more especially important with regard to such genera as have been dubiously added to certain orders, or only placed at the end of the family, as having some affinity with it. This memoir will be rendered still more interesting by the indication of the new genera belonging to each family, and the better arrangement of such of the old ones as recent observations may have thrown light upon.

In the Ebenaceæ we had pointed out a fruit with monosperm cells and a flat embryo in the centre of a fleshy perisperm. Gærtner found these characters in *Royena*: moreover, the seed, covered with only one membrane, is attached to the summit of the cell by its side; the embryo is only half the length of the perisperm, with thin lobes shorter than the radicle, which is ascendent. In the detached seeds of a *Diospyros* he saw the same structure. His genus *Embryopteris*, evidently the same as *Cavanillea* of Lamarck, differs from Diospyros only in the greater number of its stamens and of the cells of the fruit. Gærtner examined this fruit gathered before it was ripe, and in a dried state; which occasioned him to mistake the membrane which lines the cell for an arillus, and the imperfect embryo, the lobes of which were inseparable, for a monocotyledonous one; and taking it in an inverted position, he considered the calyx as superior, which ought to be at the base of the fruit, and consequently the radicle appeared to him to be descendent. It results from these combined observations, that the Ebenaceæ have the seeds attached to the summit of the cells, and consequently a superior umbilicus and ascendent radicle, and that the embryo, enclosed in a fleshy perisperm, has flat thin lobes.

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* Annales du Muséum d'Histoire naturelle, vol. v. p. 417.

† See p. 144 and 256 of this volume of the Annals of Botany.

To the genera before referred to this family must be added: 1. The *Ponteria* of Aublet, which appears to be a congener of Labatia of Swartz. 2. The *Maba* of Forster, of which I have had an opportunity of reforming the character from a dried specimen, and the manuscript of the author; and with which must rank as a species, Pisonia *buxifolia* of Rottboel Act. Dan. 2. p. 506. t. 4. f 2. or Ferreola *buxifolia* Roxb. Corom. t. 45. 3. The *Mocanera* or *Visnea* Lin. Sup. which, according to the character given, was referred to the Onagrariæ, and which M. Ventenat (upon seeing some young plants raised from seeds, sent from the Canaries under this name,) perceived to be the same as what in Riedle's *Herbier de Teneriffe* is called a new species of Royena. 4. The *Ebenoxylum* of Loureiro, which is probably only a species of Diospyros. 5. *Paralea* of Aublet, thought by M. Richard to be a congener of Embryopteris. All these genera constitute the true Ebenaceæ.

Two other genera, *Styrax* and *Halesia*, which were placed, not without doubts, at the end of the same section, offer nearly the same characters in the interior of the seed,

that

that is to say, an embryo with lobes shorter and broader than the radicle, enclosed in a fleshy perisperm.

In the *Styrax* the radicle is also ascendent; but this genus differs from the rest of the family in having, according to Gærtner's observation, several seeds in each cell; and in the stamens, the filaments of which are united at the base. In habit it approaches, as we have elsewhere observed, to the Meliaceæ, and has, like them, oblong anthers, in number double to that of the divisions of the corolla, the former varying from six to fourteen, the latter from three to seven. The *Strigilia* of Cavanilles, or Faveolaria of Ruiz and Pavon, which certainly belongs to the Meliaceæ, cannot be separated from Styrax glabrum of Swartz, of which it is a congener, and consequently will become a new species of an old genus that must be added to the Meliaceæ, whose petals, enlarged at the base, have great affinity with the monopetalous deeply divided corolla of Styrax.

The characters that distinguish *Halesia* from the Ebenaceæ are: a less divided calyx, entirely covering the ovary, and bearing at its summit, not from its base, a bell-shaped corolla, with a contracted very short border; stamens having their filaments united in a tube, and not corresponding in number with the lobes of the corolla; an angular fruit, with the cells close to its sides, leaving a considerable empty space in the middle; seeds, according to Gærtner, attached to the bottom of the cells; and an embryo with a descendent radicle. Of these characters, which are sufficient to separate Halesia from this family, some bring it nearer to the next section, and others remove it further off.

The genera formerly arranged under the second section of the Ebenaceæ are: *Paralea*, now removed to the first; *Symplocos*, *Hopea*, *Ciponima*, and *Alstonia*, all so nearly resembling one another that they have lately been united under one genus. They are remarkable for having their corolla so deeply divided as to be almost polypetalous; stamens numerous, with their filaments adhering in a tube, which is blended at the lower part with that of the corolla; an ovary distinct from the calyx during the flowering, and covered by it when mature; a fruit of many cells, each containing several seeds, of which one only is perfected; a filiform embryo, enclosed in the centre of a fleshy perisperm, and having a very long radicle. The fruit and embryo was observed by M. Richard, at Cayenne, in the Ciponima, and from analogy the same organization is indicated in the others. These characters taken together sufficiently distinguish this section; they even point out a new family allied to the last in some respects, and having an affinity also on the one hand with the alternate-leaved Myrteæ, which, however, differ in having a polypetalous corolla, and an embryo without perisperm; and on the other hand, with the last section of the Hesperideæ or Aurantia, which may be distinguished by the same characters, and likewise by a detached (superior) ovary into the receptacle of which the stamens are inserted.

I had not examined the embryo in any one of the family of RHODORACEÆ. Gærtner has observed it in *Kalmia*, *Rhododendron*, *Azalea*, and *Ledum*; in all of which it is filiform with short lobes, and a long radicle directed towards the umbilicus, and is enclosed in the centre of a fleshy perisperm. This author adds, that the seeds of Rhododendron have two membranes, and that of Azalea, Kalmia, and Ledum only one; but as these seeds are extremely minute, he might easily be deceived in this observation. It ought to be remarked also, that in all these genera the valves of the pericarp form the cells by their margins being turned inwards, and applied to the central axis; a circumstance constituting the proper character of the family. This axis, in Kalmia, Rhododendron, and Azalea, is channelled, and has its sides projecting inwards, and charged with very minute seeds as fine as dust; but in Ledum it is filiform, not channelled, furnished at the upper part only with five pendent and filiform appendages penetrating into the cells, and carrying seeds equally minute. The capsule of the last genus opens from below, and that of the other three from above. These differences, observed by Gærtner, are not sufficient to separate the genera of a family, which appears to be a very natural one. The extreme minuteness of the seeds, and the single membrane announced in some of them, may lead to a doubt of the existence of a perisperm; but it will suffice in the general character to note, that all are covered with an envelope of some thickness.

Dr. Smith has properly placed his *Menziesia* (Icon. t. 55.) in this order, on account of the structure of its capsule. The same character, according to the observation of M. Ventenat (Mem. de l'Institut, vol. 2. p. 312. t. 9.) unites with this family the *Epigæa*, formerly arranged with the Ericineæ.

We cannot leave this order without observing, with M. Richard, that *Itea* ought to be removed from it, because its petals and stamens are inserted at the top, and not at the bottom of the calyx, which is covered with a disk, and adheres to the base of the ovary. In this double character it approaches to the Saxifrageæ, of which we shall treat hereafter, and recedes from *Cyrilla* of Linnæus, which ought to remain in the next order, where it was first arranged, though confounded with Itea both by Swartz and L'Heritier.

This is the family of the Ericineæ, easily distinguished from the foregoing by the structure of the capsule, in which each valve is furnished with a septum projecting from its middle to the central axis; whence it results, that each cell is formed by the concourse of two valves. In other respects the seeds should, according to the observations of Gærtner, have great affinity with those of the Rhodoraceæ. He found in *Erica*, *Andromeda*, *Pyrola*, *Gaultheria*, and *Vaccinium*, a fleshy perisperm, containing in its centre a filiform embryo, with short lobes and a long radicle, directed towards the umbilicus: in *Clethra*, *Epacris*, and *Arbutus*, an embryo similarly situated, differing only in having its lobes longer and larger than the radicle. It does not appear that much regard is to be given to Gærtner's having pointed out a descendent radicle in Clethra, nor to his observation of a single membrane in Erica, Pyrola, Arbutus, Epacris, and Vaccinium; whilst the same is double in Andromeda, Clethra, and Gaultheria. The seeds of all these, as well as those of the Rhodoraceæ, are very minute, and consequently it is difficult to distinguish the membranes; and as to the direction of the radicle, no attention need be given to it, unless when it varies with respect to the umbilicus of the seed. If the differences are real, we ought only to conclude that they are of little value, because they exist in genera which have otherwise so great an affinity. Gærtner observes also, that the receptacle of the seeds, rising from the base of the axis, is protruded into the middle of the cell, free or without attachment, in Clethra and Gaultheria; that it is applied to the middle of the axis in Andromeda, Pyrola and Vaccinium, and to its summit in Erica, Arbutus and Epacris; that in the two last the receptacle is detached below, hanging free in the middle of the cell. This difference in the position of the receptacle at divers points of the axis, already observed in very natural families, such as the Jasmineæ, and which will be found in others, does not appear to afford a character of much importance, as is confirmed by the family of Ericineæ.

To the above genera, and such as have been long associated with them, three new ones may be added, which have great affinity with Epacris, viz. *Pirijoa* of Cavanilles, *Poiretia* of the same, or *Sprengelia* of Smith, and *Styphelia* of Solander, adopted by Smith in his work on the plants of New Holland. Gærtner has called the last Ardisia;

he found in this no perisperm, but he speaks dubiously himself of his own observation, and every thing announces that the organization of the seed should be the same in all the three genera. The *Pyxidanthera* of Michaux may likewise be added to this series, but with more certainty, perhaps, when we shall have seen its fruit. *Ventenatia* of Cavanilles belongs to this place, and according to the observation of M. Ventenat, in his Jardin de Malmaison, No. 23, to the genus Styphelia. In the same work, No. 69, it is observed, that *Solenandria* of Beauvois, or Erythrorhiza of Michaux, from the affinity it bears in several respects to Clethra, seems to belong to this series, but that it differs from it in its seeds and filaments.

The genus *Escallonia* will be also brought hither; it was placed with the Myrtoideæ, at the end of the Onagrariæ, but, having been better examined from the specimens preserved in herbariums, is found to have more affinity with Vaccinium, which it resembles in habit and in most of its characters. It has indeed a polypetalous corolla; but such petals enlarged at the base, and meeting at the lower part of their margins, resemble a monopetalous corolla, and occur, not only in this genus, but likewise in Clethra, already admitted without difficulty among the Ericineæ, and also in Tinus of Linnæus, now become a Clethra, and in Oxycoccos, considered as a congener of Vaccinium. This structure of the flower is not therefore an obstacle to this new arrangement of Escallonia. It may also be observed, that the two last-mentioned genera, together with some others, form a second section in the family, distinguished by having a calyx adhering to the ovary, and covering it entirely, and a corolla, as well as stamens, inserted at its upper part, and not at its base, as in the true Ericineæ. This section, which might constitute a separate family, serves as a connecting link between the Ericineæ and the Campanulaceæ.

Stereoxylum, a new genus of Ruiz and Pavon, should make a part of this section; several of its species appear even to belong to the genus Escallonia, to which Gærtner is inclined to add his Jungia. He thought he observed in it a very small embryo, placed at the top of a large perisperm, near the umbilicus of the seed; but from his figure, t. 35, the plant appears to belong to the Myrtoideæ, and consequently to be void of a perisperm; in which case these parts will change into an embryo with large lobes, attached to a small radicle.

No certain deductions can be made from the observations of Gærtner on the *Empetrum*, in which, however, he found the same embryo and perisperm as in the Ericineæ, only of larger dimensions, in consequence of the size of the seeds, of which one only is contained in each cell. In some respects, this genus will ever remain attached to this order, but other characters remove it to a distance. Perhaps it has more affinity with Phylica, in the family of Rhamneæ, or greater still with Cicca and Kirganelia, in the Euphorbiaceæ. But the plant which Lamarck has united with it under the name of Empetrum pinnatum, and which has no perisperm, is the *Margaricarpus* of Ruiz and Pavon, related to Ancistrum, one of the Rosaceæ. *Grublia*, which I had confounded with Empetrum, should be separated from the family, and probably would be better placed among the Myrtoideæ, near to Ophira*, of which it has the habit; on the other hand, according to Michaux, his genus *Ceratiola*, which is also diœcious, and has a berry enclosing two small one-seeded nuts, should be associated with Empetrum. The observations here made are not however offered without doubts, because the plants which are the subjects of them are not sufficiently known.

The very natural family of CAMPANULACEÆ offers a great uniformity in the organization of the seeds, as observed

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* See our observations on *Ophira*, vol. 1. p 542.

served by Gærtner, though their extreme minuteness had prevented my examining them. He has submitted to his examination the seeds of *Campanula*, *Trachelium*, *Roella*, *Phyteuma*, and *Jasione;* also of *Lobelia*, which with Tournefort he names *Rapuntium*, and of *Scævola*, to which he restores the name of *Lobelia*, first given by Plumier. All these contain, in the centre of a fleshy perisperm, a filiform embryo, with a radicle longer than the lobes, directed towards the umbilicus. In Lobelia alone, the seeds of which are of a more considerable size, he found a larger embryo, with broader lobes, flat and rounded, and a smaller radicle. This difference of form, occasioned by the greater bulk of the seeds, cannot change the affinities of this genus, nor does it prevent the character, observed in all the others, being applied to the general designation of the family. This character, of a similar structure in the seeds, confirms the affinity of the Campanulaceæ with the Ericineæ.

A new proof of this affinity is furnished both by Stereoxylum, already mentioned, some species of which have a fruit nearly capsular, opening at the sides, as in many of the Campanulaceæ, and by Ceratostema, placed at the head of the latter order, the fruit of which, presumed to be fleshy, approximates it very near to Vaccinium. If it be true that the seeds of Campanula, Scævola, Phyteuma and Jasione have but one membrane, whilst those of Trachelium, Lobelia and Roella have two, this observation of Gærtner will only afford a fresh proof that but little reliance is to be placed on this character.

It may be observed also, that the capsule opens at the upper part in Jasione, Lobelia, and Roella; at the sides in Campanula, Trachelium, and Phyteuma; and therefore that the dehiscence of the fruit does not deserve any particular attention. The case is the same with regard to the number of cells. In Campanula and Trachelium there are three, at the interior angle of which the receptacle of the seeds is fixed. This rises from the middle of the septum when the fruit has only two cells, as in Phyteuma and Lobelia. Linnæus describes a bilocular fruit in Roella; Bergius calls it nearly bilocular; Gærtner observed only one cell with seed hanging by threads from the superior part of the cell. I have thought that I have perceived the remains of a septum attached to the sides of the capsule, by the shrinking of which, in drying, it had been torn from the receptacle remaining in the centre of the capsule, and thus the two cells were reduced to one. This observation will explain the apparent contradiction in the three above-mentioned authors. Gærtner saw in Jasione a septum torn in the same way, but less contracted, leaving the receptacle free and supported at the bottom of the capsule. The plurality of the cells of the fruit may be mentioned as a character in the general designation of the family, without specifying the number.

Gesneria, in which Gærtner observed a one-celled fruit, with two receptacles for the seeds attached to opposite sides of the capsule, should be removed from this family. The same structure observed in Besleria was omitted in announcing the characters by which this genus has affinity with the Personatæ, [Scrophulariæ] at the end of which it was not without hesitation placed, but from which it is removed by this structure of the seed, as is also *Columnea*, heretofore joined with it, in which Swartz admits but one cell. The same characters appear to exist in *Achimenes*, another genus among the Personatæ, considered by Swartz as a Gesneria, and by Lamarck as a Columnea. From all this, it should seem that the opinion of M. Richard can hardly be objected to, who thinks that this little group, together with *Gloxinia* of L'Heritier, and *Eriphia* of Brown, may form a family distinct from the Campanulaceæ, and remarkable for having a one-celled fruit with parietal receptacles, a fleshy disk surrounding the base of the ovary, stamens inserted in the corolla, and not corresponding in number with its divisions. This family, which also offers distinctions in the situation of the pistil, more or less covered by the calyx, may be also enriched by the addition of *Paliavana* and *Orobanchia* of Vandelli, *Cyrtandra* of Förster, and *Sanchezia* of Ruiz and Pavon; but these plants cannot be associated till they shall have all undergone a further examination.

We shall finish our observations on the family of Campanulaceæ, by remarking, that to it should be added *Selliera* of Cavanilles, and *Goodenia* of Curtis, which approach to Scævola and Lobelia, by their irregular corolla; and also *Roussea* of Smith, which, whilst from its fructification it certainly belongs to this family, presents in its habit the appearance of one of the Rubiaceæ, on account of its opposite leaves and intermediate stipules. These affinities have already been pointed out by other writers.

It will not, perhaps, be altogether out of place here, to speak of a remarkable character that exists both in the Ericineæ and Campanulaceæ, and which establishes a new degree of affinity between these families. For what reason are the stamens, in both, inserted more in the calyx than in the corolla, deviating in this point from the general rule, that monopetalous corollas carry the stamens? Why also in these two families does the corolla, not carrying the stamens, remain for some time, and wither without falling off, in the manner of a calyx? May it be concluded from these two observations, that this pretended corolla is only an internal calycine production, by thus changing the nature and name of which, this apparent exception to the general rule respecting the insertion of the stamens may be got rid of? But this discussion will be better placed in another work, upon the insertion of the stamens, as we ought to confine ourselves here to the explanation and examination of the general characters of the seeds*.

XXXV. BLIGHIÆ,

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* We reserve our remarks on this and the other memoirs of Jussieu for a future opportunity.

XXXV. Blighiæ, *novi ex Sapindæorum Ordine naturali Generis, Descriptio, Auct.* C. K.

Etsi Sapindæorum ordo naturalis, qualem in aureo de *Generibus Plantarum* opere exposuit Jussæus, vegetabilia arcte inter se jugata continet, multa tamen adhuc supersunt expolienda; nec dubium quin, quum species eo pertinentes denuo examinaverit vir summus et, pro miro suo ingenii acumine, ad genera rite revocaverit, alteram, eamque magnopere expetendam, libri laudati editionem etiam hunc ordinem ad unguem castigatum nobis exhibituram. Qua re fretus, missis observationibus generalioribus, statim ad descriptionem progrediar novi generis quod, licet Sapindæis non potest non adnumerari, multis certe titulis ab omnibus quæ norim hujus ordinis generibus distinctissimum est.

Unica quam novimus species est arbor cujus semina, sub nomine *Akee*, ab oris Guineæ Africes, per navem hominum nigrorum mercaturas facientem, anno 1778 Jamaicæ insulam allata sunt. Terræ vero commissa arbores produxerunt quæ nunc ornamentum hortorum, et, ob fructus dulcedinem, rei cibariæ additamentum præbent gratissimum. Coma enim gaudent profuse luxuriante, ramis infimis ad terram fere dependentibus; fructuum vero substantia interna mox fusius describenda, seminum receptaculi vices gerens, sive cruda sive elixa, cibum offert quem qui gustaverint sapidissimum pronunciare non dubitant. En itaque aliud ejusdem cum *Litchi*, *Longan* et *Runbutan* ordinis vegetabile, cujus fructus in deliciis habetur.

Ad sciagraphiam nec non descriptionem hujus arboris partium faciendas, exemplis usus sum ex Musæo Banksiano, in spiritu vini asservatis, et ab illustri possessore, quæ sua humanitas est, libenter mecum communicatis. Paucula quæ adjeci de arboris truncique aspectu, nihil ejus ex autopsia exploratum habens, deprompsi ex libello Dni. A. Broughton,

A. Broughton, cui titulus *Hortus Eastensis**; nec alius mihi innotuit auctor qui mentionem illius fecerit.

Secutus exemplum botanicorum qui Cookios et Bouginvillæos non indignos censuere a quibus plantæ denominarentur, novum hoc genus sacrum volo Guilielmo Bligh, navarcho, jam vero Novæ Hollandiæ gubernatori, viro, cura plantarum et officiis olim in Floram collatis, nulli navigatorum secundo. Quanta pericula in primo ad Artocarpos Jamaicam transferendas itinere, animi fortitudine et labore improbo superavit vir optimus, a nautis seditiosis fragili cymba pelago commissus, in vulgus notum est. Ab ardua hac expeditione redux, mox, jubente rege, ad alteram felicioribus avibus se accinxit. Vela faciens in nave *Providence,* cui associatum navigium minus duce Portlock, Insulas Societatis petiit, unde, plantarum copia collecta inque navibus rite collocata, per fretum cui nomen *Torres's Straits* cursum direxit Jamaicam; mense vero Februarii anni 1793 in Portu quem dicunt Regalem ancoras jecit, et arbuscula edidit circiter 350, quæ illico per totam insulam distributæ læte vigere pergebant. Cum his vero et alias easque utiles stirpes illuc introduxit quas partim in Otaheite, partim, dum Jamaicam tenderet, in Timor, S^{tæ} Helenæ et S^{ti} Vincenti insulis summa industria colligerat. Sic ex insula Taheite *Musæ paradisiacæ* varietates meliores, *Aleuritidem trilobatam* cujus fructuum sebo et *Taccam multifidam* cujus radicum farina utuntur incolæ, cumque *Eugeniæ* et *Solani* speciebus mihi ignotis *Ficum tinctoriam* asportavit; ab Insula Timor vero *Piperem longum* nigri succedaneum, *Tectonam grandem* quæ est Robur Indiæ Orientalis, *Averhoam Bilimbi*, *Ciccam disticham*, *Arecam Catechu,* et quæ genus proprium constituit *Limoniam tri-*

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* Or, A catalogue of exotic plants cultivated in the garden of Hindon East, Esq. in the mountains of Liguanea in the island of Jamaica. Kingston 1794. pag. 10.

phyllam; ex S^{tae} Helenæ insula, ut alias taceam, *Amygdalum communem* et nanam *persicæ* varietatem.

Blighia *sapida*.

(*Akee* Jamaicensium.)

'**Arbor** quinquaginta pedes altitudine plerumque superans. *Truncus* cortice subfusco scabro tectus; *ramis* numerosis longis crassis irregularibus ad terram fere dependentibus.'

Folia alterna, ad ramulorum summitates conferta, abrupte pinnata, 4—5-juga.

Petioli communes sex circiter pollices longi, teretes vel irregulariter angulati, obsolete striati, læves, crassitie pennæ corvinæ, basi crassiores, ibique latere exteriore gibbi, interiore plani, subpubescentes, ad exortum foliolorum subdilatati; medulla tenuis, vasis spiralibus in annulum dense dispositis circumdata.

Foliola opposita aut subopposita, ovata, apice magis quam basi attenuata, tres ad sex uncias longa, unam ad duas lata, plana, integerrima, interdum subrepanda, glabra, superne nitida, inferne nervosa: nervis lateralibus irregulariter alternantibus, prope marginem incurvatis, anastomosantibus, nervo longitudinali insigniter prominente, producto in *Petiolum proprium* 4 linearem, crassum, carnosum, cum communi arcte connexum.

Racemi axillares, stricti, longitudine foliorum, simplices, multiflori, rachi pubescente subcompressa, pedunculis propriis uni- raro bifloris, crassiusculis, teretibus, lineam unam cum semisse longis, villosis, bracteatis: bracteæ ovato-lanceolatæ, basi latiores, concavæ, rufo-tomentosæ, persistentes.

Flores parvi, albi, incompleti: aliis staminibus perfectis cum ovario abortiente, aliis ovario completo cum antheris fere sessilibus infœcundis.

Calyx inferus, quinque-partitus: laciniæ ovatæ, acutæ, lineam longæ, suberectæ, concaviusculæ, basi crassiusculæ, margine tenuiores, extus tomentosæ, intus subglabræ.

COROLLA pentapetala: *Petala* ovato-lanceolata, acuminata, sub annulo nectarino inserta, laciniis calycis alterna iisque dimidio longiora, tenuia, subpellucida, margine ad lentem raris fimbriis obsita, venosa, basi aucta *Appendice* plano aut concaviusculo, interdum fornicato, pubescente, structura omnino petali, sed suborbiculato illoque dimidio breviore.

NECTARIUM, annulus ovarium aut ejus rudimentum basi ambiens, carnosus, obsolete crenatus impressionibus octo pro excipiendis staminibus.

STAMINA: *Filamenta* octo, petalis subopposita iisque duplo longiora, subulata, basi subcompressa, medio crassiora pilisque albis pellucidis villosa. *Antheræ* rotundato-oblongæ, didymæ, biloculares, erectæ, grandiusculæ, membranaceæ, sub lente pubescentes.

OVARIUM annulo nectarino immersum, dimidium lineæ longum, ovato-triquetrum, superne attenuatum, villosum, triloculare: *ovulum* in quovis loculamento unicum, arillo futuri seminis, jam ratione ovuli maximo, hirsuto, insidens. *Stylus* vix ullus nisi ovarii collum attenuatum, in fructu elongatum. *Stigma* simplex.

FRUCTUS e rubro et flavescente varius, saccumque referens plenum superne ligatum, est *Capsula* pomacea, carnosa, supera, magnitudine fere ovi anserini, ovali-cylindrica, teretiuscula aut obsolete trigona, glabra, supra obtuse sexlobata, infra vero ad calycem persistentem contracta ibique tribus impressionibus irregulariter notata, trilocularis: loculis membrana pergamentacea villis fuscis undique obsita vestitis; trivalvis, suturarum sulcis tribus prominentibus, pedunculum versus evanescentibus, superne in stylum persistentem concurrentibus: *Valvulæ* crassissimæ, carnosæ, medio septiferæ: septis structura valvularum, ad fructus centrum coalitis, demum maturitate, simul cum suturis externis, superne dehiscentibus.

Receptaculum nullum, præter loculamentorum angulum centralem, cui semina mediante arillo affixa.

Semina tria, in singulo loculamento singula, subglobo-so-compressa, saturate castanea, lævigatissima, nitidissima, magnitudine cerasi, basi ad umbilicum tuberculo suberoso oblongo aut subcordato truncata ibique cum arillo quam arctissime conferruminata.

Arillus receptaculiformis, semen mole superans, cordi bovino non absimilis, rimis profundis varie distributis et venas referentibus undique incisus et quasi lobatus, carnoso-sebaceus, lævis, albus, supra pro semine excipiendo concavus ibique margine crenis irregularibus notatus, facie anteriore convexiusculus, dorso lateribus duobus planiusculis medio concurrentibus in foveam lineari-ovatam, ubi loculamenti angulo interno longitudinaliter affixus.

Integumentum simplex, coriaceum, crassum, nuclei imprimis dorso arcte adnatum.

Albumen nullum.

Embryo magnitudine et figura seminis. *Cotyledones* erectæ, carnosæ, crassæ, maturitate pertinaciter conferruminatæ, nullo separationis vestigio relicto nisi linea in facie nuclei dorsali. *Plumula* potentialis. *Radicula* brevis, infera, acuminata, tuberculo ad basin integumenti seminis suberoso immersa.

Explicatio tabularum.

Tab. XVI. *Fig.* 1. *Blighiæ* flos integer staminiferus.

Fig. 2. petalum seorsim cum appendice, magnitudine naturali; *a*. auctâ; *b*. auctâ, cum appendice declinato.

Fig. 3. Calyx expansus cum ovario abortivo, staminibus fertilibus, excepto unico, demptis.

Fig. 4. Stamen separatum; *a*. Anthera clausa; *b*. patens; *c*. effœta: magnitudine auctæ.

Fig. 5. Calyx expansus cum ovario perfecto, staminibusque sterilibus. *Fig.* 6. Ovarium separatum cum annulo nectarifero. *Fig.* 7. Idem m. aucta, longitudinaliter sectum, exhibens situm ovulorum in arilli rudimento. *Fig.* 8. Idem horizontaliter sectum.

TAB. XVII. *Fig.* 1. *Blighiæ* fructus inaperti basin, *Fig.* 2. vero partem superiorem præcipue exhibens.

Fig. 3. Idem dehiscens, cum situ seminum arillatorum.

Fig. 4. Idem longitudinaliter et *Fig.* 5. transversaliter sectus, uno loculamentorum vacuo.

Fig. 6. Semen cum arillo separatum a facie anteriore et *Fig.* 7. a dorsali facie visum.

Fig. 8. Semen cum arillo a fronte ad dorsum verticaliter sectum.

Fig. 9. Semen separatum.

MISCELLANEOUS ARTICLES.

BOTANICAL PRIZE QUESTION.

In the first number of our Annals, pag. 187, we communicated the following prize question then proposed by the Royal Society of Göttingen for the month of November, 1805; as being worthy of the attention of the physiological botanist,

"Quum physiologi de vasculoso vegetabilium contextu diversa prorsus statuant, aliis, iisque antiquioribus, illum adserentibus, recentioribus contra in alia omnia euntibus; novis experimentis ope *microscopii compositi* curate instituendis, elici probarique cupit Societas: utrum omnino a Malpighii, Grewii, du Hamelii, Mustelii, Hedwigiique observationibus ac placitis standum sit, an vegetabilium natura ab animali fabrica prorsus differat, omninoque vel fibrarum fibrillarumque, quæ Medici est sententia, vel cellularum ac tubulorum (*tissu tubulaire*) contextu ac structura contineatur."

In answer to this question, the learned society has received three memoirs, every one of which, as we are assured in the Göttingen accounts, would singly, without competition, have been deemed not unworthy of the prize.

No. I. with the motto (in German), *Nature is most speedily found when least precipitately sought, and is only seen in her true colours when not viewed through the medium of any system.* The author endeavours to prove that all vegetables are composed of cellular texture, and, some few families excepted, of vessels. According to his opinion, in the beginning the cellular texture only is present, and the vessels are afterwards formed. In the progress of the growth of the plant, the cellular texture takes on different degrees of hardness; part of it, being more drawn out longitudinally, and becoming denser and finer, constitutes the elongated cells, which have been frequently taken for true vessels.

The vessels (though this, from some unsuccessful experiments, is denied by Sprengel) may indeed be filled with coloured fluids, and do anastomose, but not in the same manner as those of animal bodies. They appear either as canals with simple membranous internal surfaces, in the Acerosæ, most of the Najades, and some others; or more frequently, as fine filiform vessels formed by spiral circumvolutions, which afterwards coalescing, become woody, and constitute what is called the *treppengänge* by the German botanists, *fausses trachées* by M. Mirbel. For this reason the latter are met with in the old and woody parts, whilst on the other hand the real spiral vessels occur only in the younger parts of plants. The fibre itself, of which the spiral vessel consists, is not hollow, conveys no juices, nor can it be injected with a coloured fluid. The juices are only found in the canals formed by the spirals of these threads, which still continue to convey fluids after the spirals have coalesced. Besides these, according to this author, there are no other vessels; Hedwig's lymphatic vessels (as has been also shown by Sprengel and others) are nothing more than remnants of the cellular substance, continuing to adhere to the epidermis. There are no membranous vessels lining the inside of the canal formed by the spiral fibres, nor are there either medullary or air vessels. Neither does a proper tubular texture (*tissu tubulaire*) such as described by Mirbel, exist in plants. The French naturalist is stated to have under this appellation confounded the most heterogeneous things. There are no fibres extant in the plant but those that form the spiral vessels. What are called *spiegelfasern* by Mr. Medicus are nothing but medullary elongations; and the medullary fibres of this observer appear for the greatest part to be spiral vessels become woody. Air is not contained in the spiral vessels, but partly in the hollow stalks and other vacuities, as in grasses, umbelliferous plants, &c.; partly in large canals, as in several water-plants; partly in the pith, as in trees, shrubs, &c. There proceed from the pith of trees and shrubs, in all directions, elongations, which, when the former organ is itself destroyed, can convey the air to all parts; in the same manner as in the above-mentioned plants, the canals, the pith, and other reservoirs of air, also communicate with the common cellular texture; and in the remaining few plants which are destitute of these large reservoirs of air, the cellular texture supplies their place, and contains the air, though commonly not in a gaseous state, but fixed in the sap. The pores are not the immediate organ of absorption and decomposition of the air. The fluids are partly absorbed by the cellular texture and vessels of the root, partly at the surface of the plant, and are afterwards elaborated within. The proper juices are found both in the vessels and the *treppengänge* (*fausses trachées*), from whence the sap enters into the elongated cellular texture, when part of it is again conveyed into the loose or large-celled texture, which, according to the author's opinion, conveys only the common vegetable sap. This latter sap, when the part increases in circumference, forms new vesicles, new cells, and new vessels; so that the vessels in the alburnum are (1) nothing but elongations of the liber or of the vessels contained in the wood, but can (2) not be considered as forming the whole of it; the greatest part of what is seen both in the alburnum and wood being compressed cellular texture. In new shoots a real elongation of vessels takes place; these elongations, however, are not produced by extension, but by the deposition of new matter, in the same manner as all the parts originated. The author also points out the homogeneous nature of all the parts of plants, by means of which he explains many well-known vegetable phænomena, such as the multiplication of the flowers. Also, from this homogeneity of the vessels, it is a matter of indifference whether they absorb from the one extremity or the other: whence it is, that a tree can grow in an inverted position. The vessels not being furnished with valves, the sap contained in them can take either direction: a circulation, therefore, as it is observed in the animal body, does not exist in vegetables; but the fluids have only, according as circumstances demand it, an ascending and descending, and also a lateral motion. Whence the continuance of vitality in parts separated from the body of the plant, &c.

No. II. having the motto, *Equidem tunc naturæ rerum gratias ago, cum illam non ab hac parte video quæ publica est, sed cum interiora ejus intravi,* bespeaks an author equally conversant with the structure of vegetables. In the five chapters of his memoir the principal points of the question are not only illustrated by new observations and experiments, accompanied by anatomical designs, but the author also expatiates on several circumstances immediately connected with his subject. He agrees with the author of the former memoir in stating that the solid parts of almost all perfect plants are composed of cellular texture and vessels only; that the former, in a more advanced state, is more or less indurated, and even becomes ligneous; that it is completely different from the mucilaginous matter of the animal body; and that, in general, a double mode of formation may be admitted. Both authors agree also with regard to the nature of the epidermis, the hairs, &c.; that the vessels do not anastomose in the same manner as in the animal body; that they admit of artificial injection, and are wanting in the Musci frondosi and Hepaticæ; that the *treppengänge*, as they are called, are formed by the coalition of the spirals of the vessels; and in several other respects, as in their account of Hedwig's lymphatic vessels, the motion of the sap, &c. But the following observations are peculiar to him: that there is, in all perfect plants, but one kind of vessels, namely, the spiral, which, from their office, he rather wishes to call *vasa adducentia*; that what appear like spiral fibres are, as was first stated by Hedwig, real vessels, capable of being injected with different-coloured fluids; that it is not improbable that these *spirals* may be connected with each other by means of delicate membranes; and that the canal thus formed may, under certain circumstances, also serve for conveying fluids. But a real membranous vessel, such as Hedwig pretends to have observed within the spirals, he could not discover. No more could he perceive any membrane surrounding the exterior of the spirals, as has been lately mentioned by another botanical physiologist. He further remarks that the Acerosæ are by no means destitute of spiral vessels, as has been maintained by Frenzel, and after him by the author of No. I.; for, according to his subjoined figure, these are not only very obvious in the seedling plant, but may likewise be seen in such as are more advanced, though fewer in number and more difficult to be distinguished. So, whilst in the former memoir spiral vessels are denied to several of the Najades, this author is of opinion that but few of these vegetables are without them; though they may be less abundant and more difficult to investigate.

With regard to the original formation of the cellular texture, the author of No. I. entirely agrees in opinion with Prof. Sprengel; but, according to the former, the vesicles or globules, out of which, during germination, the cells are said gradually to be developed, are real starch (*amylum*), which, if his observation be correct, exists in that form within the cells of the roots and seeds. He further maintains that each cell is to be considered as a distinct closed vessel. If an extravasation from one cell into the other takes place, this can only be by means of extremely minute and perfectly invisible apertures. This is also the opinion of Bernhardi, in his memoir on the vessels of plants. Both these authors deny, with Sprengel, the existence of pores such as described and figured by Mirbel, through which the fluids are said to pass from one cell into the other. The author of the second memoir throws some further light on those supposed pores: to him they do not appear to be merely vesicles, which, according to Sprengel and the author of No. I., adhere to the sides of the cellular texture, or are sometimes found floating in the fluids of those cells, but real globules of *fecula*. Peculiar to the author of No. II. is, moreover, the observation on the reservoirs or canals that contain the proper juices. These have been almost universally considered as particular vessels: and even the author of No. I. is still of opinion that they are canals with internal membranous linings. Our author is perhaps nearer the truth by taking these canals for mere tubular cavities, rising within the cellular membrane, but without any thing like membranous internal surfaces. Hence also, according to him, there is but one sort of vessels in perfect plants, namely, the spiral vessels: all the other parts appearing like real vessels are nothing but cavities in the cellular texture, which part in plants adopts a variety of forms. There are also in this memoir some observations of its author relative to the sap of plants, their green matter, and other collateral subjects. As particularly good, and enriched with many new views, we cannot omit mentioning the fourth chapter, *de fabrica plantarum in genere*; nor is what the author advances in the last chapter, respecting the structure of the *anomalous vegetables*, less interesting and novel; to these are referred the Mosses, Lichens, Algæ, and Fungi, which latter by the author of No. I. are considered,

sidered, but not on sufficient foundation for so doing, as belonging to the animal kingdom.

No. III. has the motto, *Quo altius in naturæ arcana nos insinuare conamur, eo magis patet, nos ad ultimum ejus mysterium nunquam perventuros.* Its author expatiates upon the main points of the question, and communicates valuable remarks, particularly respecting the origin and formation of the bark, liber, and wood; the whole illustrated by drawings: he, however, does not enter so deeply into the details of the subject, nor are his explanations of many points so satisfactory as those of the authors of the two former memoirs, especially of the second.

Both the authors, therefore, of No. I. and II. being thought equally worthy of the honorary reward offered by the society, the prize was accordingly divided between them. On opening the sealed paper belonging to No. I. the following name appeared: *Dr. Charles Asmund Rudolphi*, of Greifswalde; that of No. II. contained the name of *Dr. Henry Frederic Link*, professor of natural philosophy, chemistry, and botany at Rostock; both well known and esteemed as excellent naturalists. The author of No. III. (who, we understand, is *Dr. Treviranus* of Bremen) received the *Accessit*, together with an honourable mention of his name.

EXTRACT OF A LETTER FROM PROFESSOR LINK OF ROSTOCK.

You may perhaps know already from public papers that the prize for the question respecting the vessels of plants proposed by the Royal Society of Göttingen has been divided between Prof. Rudolphi of Greifswalde and myself. I intend soon to publish my memoir, under the title *Elementa Anatomiæ et Physiologiæ Plantarum.* I have shown in it that the spiral vessels are real *vasa adducentia*; that the *lamina spiralis* conducts the sap in its channelled interior side, as in a female screw, by which Hedwig was mistakenly led to suppose that a sap-vessel was twisted round an air-vessel. The sap passes over from these spiral vessels directly into the cells, or exudates into them. This may be clearly observed upon placing a plant with adstringent sap in a solution of sulphate of iron, or a leaf of Aloe succotorina in oxygenated muriatic acid, which gives a red colour to the gum-resinous sap in the cells, but leaves the spiral vessels colourless. The *treppengänge* (Mirbel's *fausses trachées*) really take their origin from the spiral vessels. The Pini have spiral vessels in their young state; a fact denied by others. Each cell of the cellular texture is surrounded by a membrane, and hence separated from the adjoining cell by a double membrane; so that the juice can pass over from one cell into the other by exudation only. The inner bark and part of the wood consist of elongated cells; for plants have no vessels except the spiral, and these are wanting in the Mosses, Hepaticæ, Lichens, Algæ, and Fungi, as also in Zostera, Lemna, and Ceratophyllum, which vegetables consist entirely of cellular texture. The proper sap is contained in the interstices of the cellular texture, or the receptacles situated among the cells: hence *vasa propria,* as real vessels do not exist. The greatest part of the spiral vessels, and the most healthy ones, are situated round the medulla, where indeed the sap ascends with particular vigour. The theory of the growth of the root and of the wood does not admit of any short abstract.

I have discovered near Rostock a singular aquatic Alga, consisting of threads spirally twisted, of a green colour, and their interior of a completely uniform substance. The threads are often twisted together, but usually disengaged. They move like the Oscillatoriæ of Vaucher, to which genus this plant approaches very near, being, like it, also found in flocci on the surface of the waters. I call it SPIROGYRA *æruginosa.*

Count Hoffmannsegg and I shall soon publish the first number of our Flora Lusitanica, containing the natural orders of the Labiatæ, Verbenaceæ, and Borragineæ. Among the new species described are: Mentha tomentella, nearly related to M. Pulegium; Origanum virens, Thymus albicans, capitellatus, camphoratus, variabilis, repens; Stachys lusitanica, much resembling S. germanica, but with cordate leaves; Salvia polymorpha, a variety of which is S. bullata Vahl; Echium tuberculatum; Cynoglossum nitidum, or Omphalodes lusitanica elatior Cynoglossi folio *Tourn.*, referred by Linnæus to his Cynoglossum lusitanicum, which does not grow in Portugal. That Linnæus's C. lusitanicum is a Siberian plant, I have learned from Dr. Smith. Of most of these plants the figures are given. Besides these there is Thymus Cephalotes, Marrubium cinereum, Salvia patula. It will appear from this that many additions maybe made to Brotero's Flora Lusitanica, nor is the number of corrections inconsiderable. The confusion which prevailed with respect to Ballota alba and nigra is here likewise cleared up: the latter, according to Smith, is a variety of the former; but the B. nigra, such as described by most Flora writers, is certainly a distinct species.

EXTRACT OF A LETTER FROM PROFESSOR OLOF SWARTZ OF STOCKHOLM.

—Your enterprise in publishing the Annals cannot fail to be highly gratifying to all lovers of botany, whose obligations to you for many excellent remarks, no where else to be acquired, must ever be great. For my part, I feel this myself, and shall look forward with eagerness for the sequel. In the mean time, as in my botanical pursuits I have had but one point in view, that of being useful in the promotion of our amiable science, I am happy to find, by the notice you have taken of my performances, that my endeavours are not disapproved.

In perusing the volume before me, I have noted down a few remarks, which I beg leave to communicate. Si quid novisti rectius, &c.

P. 32, in the Retrospect of Botanical Literature, in mentioning Dr. Bernhardi's arrangement of the Ferns, and his genus *Ripidium*, you seem to disapprove his classing the *Schizæa* among his sic dictæ *Agyratæ:* this is not done, however, without reason, as it really wants an *annulus verus*, the capsules are only *vertice concentrice** *striatæ*, although these striæ run sometimes down the sides, but the capsules open longitudinally and regularly (*semibivalves*) as in all the *filices exannulatæ* (*spurie gyratæ* mihi), which is by no means the case in any of the *genera gyratarum* (*annulatæ*). I think that Dr. Bernhardi, though I am not attached to his classification and terminology, is right in this instance, which I consider as one of consequence. As for his Ripidium, it is in my opinion the Acrostichum dichotomum of Linnæus, and of Forster. Vahl thought so too. Petiver's figure appears to me to approach nearer to *A. dichotomum* than *S. bifida*, in respect to the more divided frons, and to the number of the appendiculi, which are septeni in *dichotomum* and quindeni in *bifida*. The latter I have from N. Holland. Long before I saw Dr. Bernhardi's paper, I had altered my ideas about the place of Schizæa, and determined it to belong to the spurie gyratæ, with which, however, the Schizæa spicata of Smith can never unite, being a real annulata and a species of Onoclea.

P. 107. What Dr. Bernhardi (in the note) calls *Cyathea bulbifera* is an Aspidium. His *Asplenium ramosum* is the real *A. bulbiferum* of Forster.

P. 114. As for his desire (in the note) to know if the *Polypodium Dryopteris* and *Phegopteris* have an indusium, I can declare with the most indubitable certainty, that they are wholly destitute of this part.

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* At any rate the term *concentrice* appears to be misapplied. Ed.

By reading your interesting account of the *Metroxylon Sagu*, (p. 193. seq.) I was particularly struck with the similarity between this and another species of the same genus, of which I have seen a racemus about six feet long, brought to Sweden in an East Indiaman through an acquaintance of mine, who bought it of a French traveller at the Isle of France, just then returning from Madagascar, of which island the palm is said to be a native. This, as to sheaths and lateral branches, much corresponds with your description. The latter are also compressed, woody, and consist of 10—12 joints, with their alternate sheaths, but more contiguous one to another; so that the whole is like a spica composita bifaria, one foot or more in length: for from the sides of these sheathed joints there issue the half-foot long spikes or jointed pedicels, not cylindrical as yours, but somewhat compressed, composed of numerous smaller sheathed joints, at whose sides the opposite flowers are inserted; the males 10—20 pair at the top of each spicula, and the females beneath, and more numerous than the males. The former consists of a triphyllous calyx, and a tripetalous corolla. The leaflets and the petals cohere at the base, but the petals are twice as long, acute, erect, connivent, smooth, shining, rust-coloured, coriaceous, persistent; stamens six, united or coalescing at the base. The females are concealed within the smaller sheaths, enveloped in six leaflets, with a large germen and a short style, scarcely longer than the leaflets. The acute stigma under the microscope appears trifid. The fruit gradually increasing (I have seen it in every stage) becomes as large as a hen's egg, perfectly resembling that of the *Sagus* or *Palma Pinus* of Gærtner, the rind covered with shining scales directed downwards, &c. From this I conclude it to be a species of Metroxylon, and a very remarkable one. It is probable that M. du Petit Thouars will hereafter give a complete account of the whole. I shall send a specimen (and a lateral branch if I can) next spring, for Sir Joseph Banks's museum, by which you will have an opportunity of judging how far I am in the right.

The remarks of Don L. Nee (p. 205) on the flowers of *Musa*, I have found in some measure true. I frequently observed only five stamens in the flower in loco natali, sometimes however six. In some, gathered by Hasselquist in Palestine, I can easily distinguish both numbers; and if even a steril one should be found in the hermaphrodite flower, the number of the fertile ones ought certainly to determine the class; and Musa accordingly ought rather to be referred to Pentandria, which is so much the more natural as the numerus quinarius is the most common.

P. 283. *Byssus Jolithus.* The peltæ minutissimæ planæ turbinatæ albidæ on *B. Jolithus* L., mentioned by Retzius, I have also observed, but believe with Dr. Acharius, that they do not belong to the Byssus, but are some particular species of a *Peziza*; they are, however, of very rare occurrence.

I have long since been of your opinion that M. Ventenat's *Agyneia impubes* is the *Phyllanthus bacciformis* L.: as for the Agyneia, this genus has in reality a very distinct stigma, though Linnæus characterizes it as wanting both stigma and style. Some time or other I shall take the liberty to send you my observations on this subject.

Upon the genus *Usteria* you may probably have seen Dr. Afzelius's dissertation. You both agree in regard to the fruit; but the very accurate examination of the flower made by Dr. Afzelius, proves some deficiency in Professor Willdenow's description of that part also.

The elucidation of the paradoxical *Adiantum truncatum* L. is very interesting. Mr. Dryander gave me also these hints in London, and must have known it previous to the return of Mr. Menzies. I had accordingly excluded the same in my arrangement of the Filices.

The review of Dr. Acharius's Methodus (p. 371) I have communicated to him. He writes to me, that he finds several remarks well founded, and that he has already in many instances adopted the same ideas. The number of his species is greatly increased since the publication of his Methodus, from the frequent communications of his friends throughout Europe. This will also enable him to render his work more complete in future. He has separated from the *Opegraphæ* (in my opinion very judiciously) several species, which will form a different genus, called, as I believe, *Arthorica*. The genus *Bœomyces* will also be differently arranged.

The observations of Cavanilles upon the fructification of ferns and mosses (p. 409. seq.) have vanished into nothing! In a letter to me, dated Oct. the 25th 1803, he says: “ à présent il faut que je vous avertise, que la découverte “ sur les corps lenticulaires dans les mousses et les fougères “ est *nulle* et réduite à erreur optique. D'après deux années “ d'observation, je voyois les dits corps tels que je les ai “ décrits, mais me méfiant de ce que je voyois (et plus que “ quarante personnes aussi) je variois les observations ; j'ai “ pris au commencement d'Octobre un chalon d'Equisetum “ pour répéter les observations d'Hedwig, et bientôt je “ découvrais les dits corps. D'abord je croyois qu'il s'étoit “ attaché par hazard au cristal porte-objet ; mais l'ayant “ lavé soigneusement je retrouvais toujours le dit corps. “ Persuadé alors que ces corps étoient dans le cristal, à “ force des recherches, je me suis convaincu, que les corps “ lenticulaires étoient des petits défauts de cristal imperceptibles à la vue simple, et même armée d'une loupe ordinaire, “ mais réels et visibles au microscope de Delabard. Je les ai “ retrouvé dans d'autres cristaux, que j'ai fait travailler, et “ c'est encore une raison de plus pour annoncer ma méprise, afin que quelques autres observateurs ne tombent “ dans la meme erreur.” Cavanilles was, as many others,

often rather hasty in his conclusions; but always eager to promote his science. He was, indeed, a man of a very noble mind, and of the most generous communicative turn; so that I feel I have lost much by his untimely decease, which I shall ever regret.

The twenty-seventh article I find comprises the whole of my attempt to arrange the ferns. The study of the individuals of this interesting natural order being my chief amusement, I have since endeavoured to render that little work somewhat more complete, and to add continually to the stock. And having been informed that a German bookseller intended to reprint my paper by itself, such as it appeared in Schrader's Journal, I have yielded to the entreaties of several friends, and prepared an enlarged edition, which is now printing at Kiel, under the title of *Synopsis filicum*, as a kind of a prodromus to an Historia Filicum, to be hereafter published (si diis placeat). Besides many corrections, (among which I soon found those necessary that you have pointed out in the Annals, which have also resolved two doubts that I laboured under) I have added near 200 descriptions of new or less distinctly known species, and some plates. I will not say any more about it at present, but await the judgment of candid reviewers.

As for Mr. Turner's monographia on *Bartramia* (p. 517. seq.) I cannot but consent to a great part of his mode of reasoning upon the subject, but do not coincide with him in the slight notice he takes of the inner peristomium in the different genera of mosses. *Neckera* and *Leskea*, for instance, I look upon to be determined as distinct from Hypnum; and I dare maintain, that from the utmost resemblance of many species belonging to these genera, they cannot be satisfactorily distinguished without due attention to these, apparently less remarkable, minute parts. But, hic labor hoc opus. The closer examination ought here to be as little neglected as in the microscopical confervas, or minuter mushrooms. The *Bartramia Menziesii* I find, from inspection, to be the same as *B. integrifolia* of M. Palisot de Beauvois; and also *B. squarrosa*, the same as *B. reticulata* of this author. The *Mnium tomentosum* of my Prodromus is a most distinct species of *Bartramia*, and totally different from *B. Menziesii* in all its parts. I intend soon to give a more particular account of the same, as well as of several other species of this genus.

In the extracts from the Annales du Mus. d'Hist. Nat., or M. Jussieu's Observations on the Onagrariæ, it is said to be confirmed by M. Du Petit Thouars, that *Isnardia* has a tubular calyx, and consequently inferior. This, however, is not any thing new. Our most excellent Schreber describes Isnardia in his Genera Plant. p. 84. in this manner*. Certainly it can never be confounded with *Ludwigia*. I have not had an opportunity to find out if *Ludwigia nitida* of Michaux and *L. apetala* of Walter have the same character; but, as for my *Ludwigia repens*, Fl. Ind. Occid., it is, and must ever be, a *Ludwigia*. The calyx is exactly superus, the petals very distinct, the capsule tetragona coronata and truly apice dehiscens. That the want of petals is a sufficient character, every body must doubt who knows its variability in some *Ammanniæ*, &c.

Among the plants of Michaux in his Flora Bor. Amer. I am perfectly confident, that his *Vaccinium hispidulum* is neither a *Vaccinium* nor an *Arbutus*, but in fact a *Gualtheria*, as it has a capsula baccam mentiens, the calyx double, interiore baccato capsulæ accreto! The *Pachysandra* is probably not a distinct genus from *Cercera* of my Flora Ind. Occid. (formerly *Crantzia* in Herb. Banks.)

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* In our account of the Supplement to Jussieu's Memoir on the Onagrariæ, Ann. of Bot. v. i. p. 539, it is said that Isnardia had been arranged with the Salicariæ upon the supposition of its having a *superior* (misprinted for *inferior*) calyx. This error may have misled our correspondent, who appears to have totally misconceived Jussieu's meaning.—Ed.

IRRITABILITY OF THE GARDEN LETTUCE.

Professor Carradori has written a paper on the irritability of plants, to which he was led by the following curious phænomenon observed by him in the garden lettuce (*Lactuca sativa*).

Upon touching slightly with his finger the small amplexicaul leaves dispersed on the branches, or the calyxes of this plant, at the time of flowering, he perceived that from the place so touched there immediately issued the proper milky juice in the form of very minute drops. The stalk leaves, however, could not be affected in this manner by the application of a stimulus. The touch of any solid body whatsoever, even of the smoothest, was found to be a sufficient irritation to produce this exudation, and sometimes, when touched by any very fine-pointed body, the milky juice could even be seen, if attentively viewed, to be ejaculated in the form of vapour. A drop of water or even of mineral acid, if applied softly, without producing any concussion, never excited the smallest degree of exudation; but if one or more drops of any liquid were made to fall upon the leaf, both the place where the impression was made, and that down which the liquid flowed, showed the milky exudation. Neither heat nor cold produced any sensible effect, of which he satisfied himself by approaching a red-hot iron, and a lump of ice. He observed that the ants visiting this plant stuck fast by their feet in the clammy milk, the flow of which their light steps were sufficient to produce. This he fancifully enough compares to the fabulous streams flowing with milk in the blessed regions: *Flumina jam lactis, jam flumina nectaris ibant.*

The plant preserves this irritability after being taken out of the ground, and in its detached branches, as long as a certain degree of vitality remains. What appears particularly remarkable is, that the ejaculation continued even when the plant was submersed in water, upon the application of the necessary stimulants.

The Professor concludes that this phænomenon could only be the effect of some instantaneous contraction excited in the organization of the plant, without which the milk could not be forced out of the organized pores of the lettuce. It is precisely similar to the contractions of animal irritability, which are excited by the application of a stimulus, and cease when this is removed; and, as in the animal fibre, these contractions may be renewed by the repetition of the stimulus, but cannot be prolonged by its continued application, as the fibre must relax after a time, notwithstanding the presence of the exciting cause.

BOTANICAL EXPEDITION.

From a letter, dated Irkutzk, April 24, 1806, we learn that the Emperor of Russia has sent Dr. Redowsky on a most extensive botanical expedition to the north-east extremity of Asia. This botanist had originally been appointed to accompany the late Russian embassy to China, but which not being able to proceed further than the Chinese wall, was at the date of the letter at Irkutzk. From this place the intended route of Dr. Redowsky is down the river Lena to Jakutzk, from whence he is to follow the course of the river Aldan as far as its sources in the Mongol mountains. These, together with the Jablonoi-Chrebet (Apple-Mountains), are to be explored as far as the Eastern Ocean. Along the borders of the last-mentioned river the excursion is to extend as far as Ochotsk, where he will probably arrive in September of this year. From this place he will proceed to Kamtschatka, either by land round the Penginsk Gulf, or by sea to Bolsheretzk, and remain there during the winter. In the following summer the doctor is to proceed to the Kurile Islands, as far as he is able towards Japan, and after this to the Aleutean Islands as far up as the continent of America. On his returning he is ordered to examine the vegetable productions of the Behring's and Copper-Islands. Having staid another winter at Kamtschatka, the third summer's tour will be to Sagalia and the islands at the mouth of the Amur, and from hence up the Amur, through Yellow Mongolia and Nertshinsks, returning home by Davuria and Siberia.

DEATH OF BOTANISTS.

We are sorry to have to announce the death of that well known, industrious and able collector Mr. Francis Masson, which happened about Christmas last, at Montreal in Canada. With the following few particulars of his services, to which the royal garden at Kew is indebted for so many of its choicest productions, we have been favoured by his friend Mr. Aiton, who extracted the dates from the books of the garden, and from some brief notices registered, at the desire of the deceased, on the frame surrounding his portrait.

Francis Masson, born at Aberdeen in Scotland, in August 1741, was first engaged in his Majesty's service to collect plants for the royal botanic garden at Kew, in 1771 or 1772, at which time he was sent out to the Cape of Good Hope. Here he remained till 1770; when he was ordered to explore the Canaries, Azore, Madeira, and part of the West India Islands; in which mission he consumed about five years more, and returned to England in 1781.

In 1783 Mr. Masson went to Portugal on the same errand, and thence to Madeira; returning home in 1785, in order to prepare himself for a second voyage to the Cape of Good Hope, where he arrived in 1786, and laboured in the duties of his calling till the year 1795, when he left the Cape, and once more returned to England.

In 1797, having intimated his desire to be further employed on foreign service, Sir Joseph Banks mentioned the same to his Majesty, who was graciously pleased to order him to explore such parts of North America, under the British government, as appeared most likely to produce new and valuable plants. On this mission he perished in the sixty-fifth year of his age.

This country has also lost a very able botanist, and an amiable member of society, in Major Velley, who unfortunately perished July last, by the overturning of a coach in which he was travelling. His "Coloured Figures of Marine Plants, found on the Southern Coast of England, illustrated with Descriptions and Observations, &c." have rendered his name familiar to the student of the submersed Algæ.

July 1st died at Leipzig, in the 34th year of his age, Dr. Romanus Adolphus Hedwig, the son of the celebrated muscologist, and his successor in the professorial chair of botany in that university. We have before had occasion to mention his writings, which are principally cryptogamic.

ENGLISH WORKS ON BOTANY PREPARING FOR PUBLICATION.

We are happy to find that Mr. Brown and Mr. Ferd. Bauer are sedulously employed in arranging their important materials for a work which cannot fail to prove a lasting monument both to their indefatigable zeal and the talents by which they are so eminently distinguished; the former as one of the most philosophical and accurate botanists of the day, the latter as an artist whose performances (like those of his brother) unite, with a truth hitherto unseen in botanical paintings, all the neatness, grace, and effect, so much admired in the works of a Mignon and Van Huysum.

It is scarcely necessary to add, that the work alluded to is the result of their botanical researches on the expedition of captain Flinders to New Holland, of which we have had an opportunity to mention some particulars in the miscellaneous articles of the first volume of these Annals. The mode in which their publication will be offered to the public is unknown to us; we suppose, however, that it will be preceded by a prodromus by Mr. Brown, which will convey a better idea of the variety and singularity of his materials than we are able to give in this place.

Of the *Flora Græca Sibthorpiana*, so long and anxiously expected by the botanist and the classical student, the first half of the first volume will at length make its appearance in the course of a few days. If we except the drawings, which are all from the pencil of Mr. Ferdinand Bauer, even at that time to be ranked high in his profession, it is generally understood that the original materials, left by Dr. Sibthorpe, are but scanty; nevertheless we are confident that, in the hands of Dr. Smith, they must afford the groundwork of a structure, which will not prove derogatory to the fame he has so justly acquired, both as a botanist and an elegant writer.

The whole will be comprised in ten volumes.—The prodromus of part of this Flora will appear at the same time.

The fourth fasciculus of Mr. Rudge's *Plantarum Guianæ rariorum Icones et Descriptiones hactenus ineditæ*, the former parts of which have met with a favourable reception, will soon make its appearance. The figures in this work, by the fair and skilful hand of his accomplished lady, far exceed those also made from dry specimens in the publications of Vahl, &c., and are correctly engraved.

Mr. Dawson Turner's general work on the Fuci, as may be inferred from the great abilities of this naturalist, and his excellent opportunities of studying this difficult tribe of plants, will undoubtedly rank high among the works we possess in Botany. The first number, we understand, will appear about Christmas.

Mr. Lambert is about giving an Appendix to his splendid work on the genus Pinus.

Dr. Coyte has in the press the first part of a botanical nomenclator, entitled "*Index Plantarum,* or An alphabetical Arrangement of above 1400 Genera and 12,000 Species of Plants, from the first to the sixteenth Class." To the name of each species will be added a reference to a plate, or to the work where it is first mentioned; and in the course of the work some observations on the medicinal virtues of the British plants will be added.

Mr. Lily Wigg, of Yarmouth, well known to the student of English Botany, has compiled a work on esculent plants, which we hear he is actually employed in preparing for the press.

A foreign professor, well known as an able botanist, being inclined to part with his very extensive herbarium, we are induced to lay the following account of it before the public, as perhaps amongst our readers some one may be found, who would be glad to acquire so very complete a collection; and such an opportunity must be a rare occurrence, which may not offer again for many years. The herbarium comprises, in 1341 genera, 8000 species, and a great number of specimens; the possessor having made it a point to collect as much as possible all the varieties, and succeeded in obtaining both native and garden specimens of very many of the species. Among them we find almost the entire Floras of Sweden (including Lapland), of Germany, Switzerland, and France; a very rich collection

tion of exotic vegetables from all parts of the world, for instance, about 600 specimens from St. Domingo (among which are many nondescripts), some hundreds from Jamaica, as many from the Cape of Good Hope, from the East Indies, &c. To give some idea of the whole, it may suffice to mention that there are 42 species of Arenaria, 46 of Campanula, 102 of Carex, 76 of Erica, 53 of Euphorbia, 41 of Hieracium, 21 of Laurus, 29 of Melastoma, 31 of Mimosa, 23 of Piper, 56 of Salvia, 30 of Solanum, 58 of Trifolium, 90 Orchideæ, 218 Filices, and 340 of Musci frondosi. The herbarium is particularly rich in Grasses. All the plants are in high preservation; partly slightly pasted down on white paper, partly loose in whole sheets. Great attention has been paid to the obtaining of good and perfect specimens; and of many of the rarest there are the most beautiful ones, such as of Adansonia, Cypripedium bulbosum, Lecythis, Krameria, Marcgravia, Panax morototoni, Passiflora maliformis, Theophrasta, &c. All the plants are determined with exactness, and compared with those of many other herbariums. They are all arranged according to the Linnean system, except the Orchideæ and Filices, classed after Swartz and Smith; the Musci frondosi after Hedwig; the Lichenes after Acharius; the Algæ after Roth. The Fungi are not comprised in the above number of 8000; the collector will add all he possesses of them. The phænogamic plants, Filices, and Algæ, are contained in 105 port-folios of green pasteboard in folio; the mosses in four port-folios of the same kind, but in 8vo.; the Lichenes and Fungi are not pressed, but lie free in drawers.

An exact catalogue will be delivered. The price demanded for the whole is 400 guineas.

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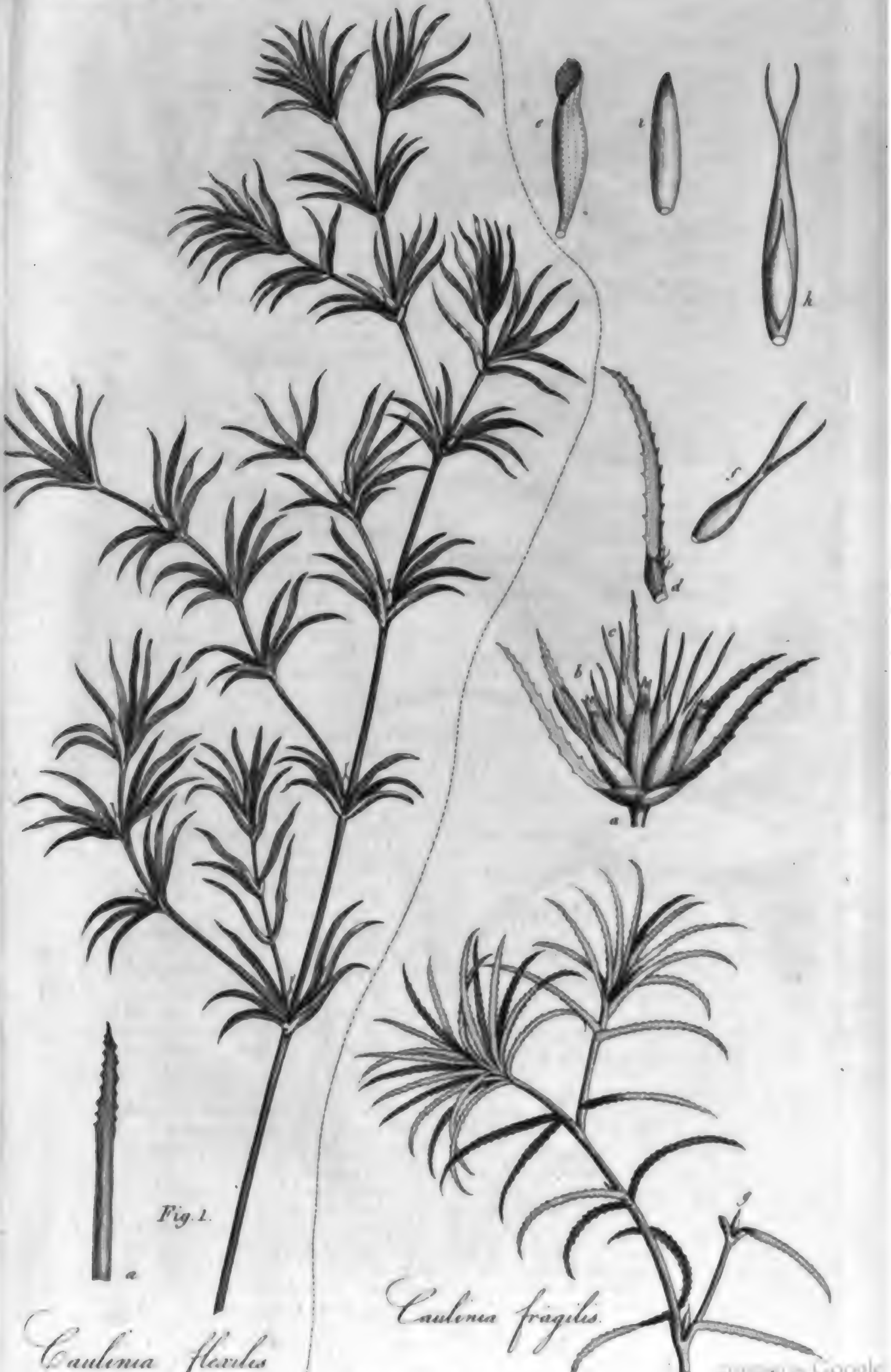
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Caulinia flexilis

Caulinia fragilis

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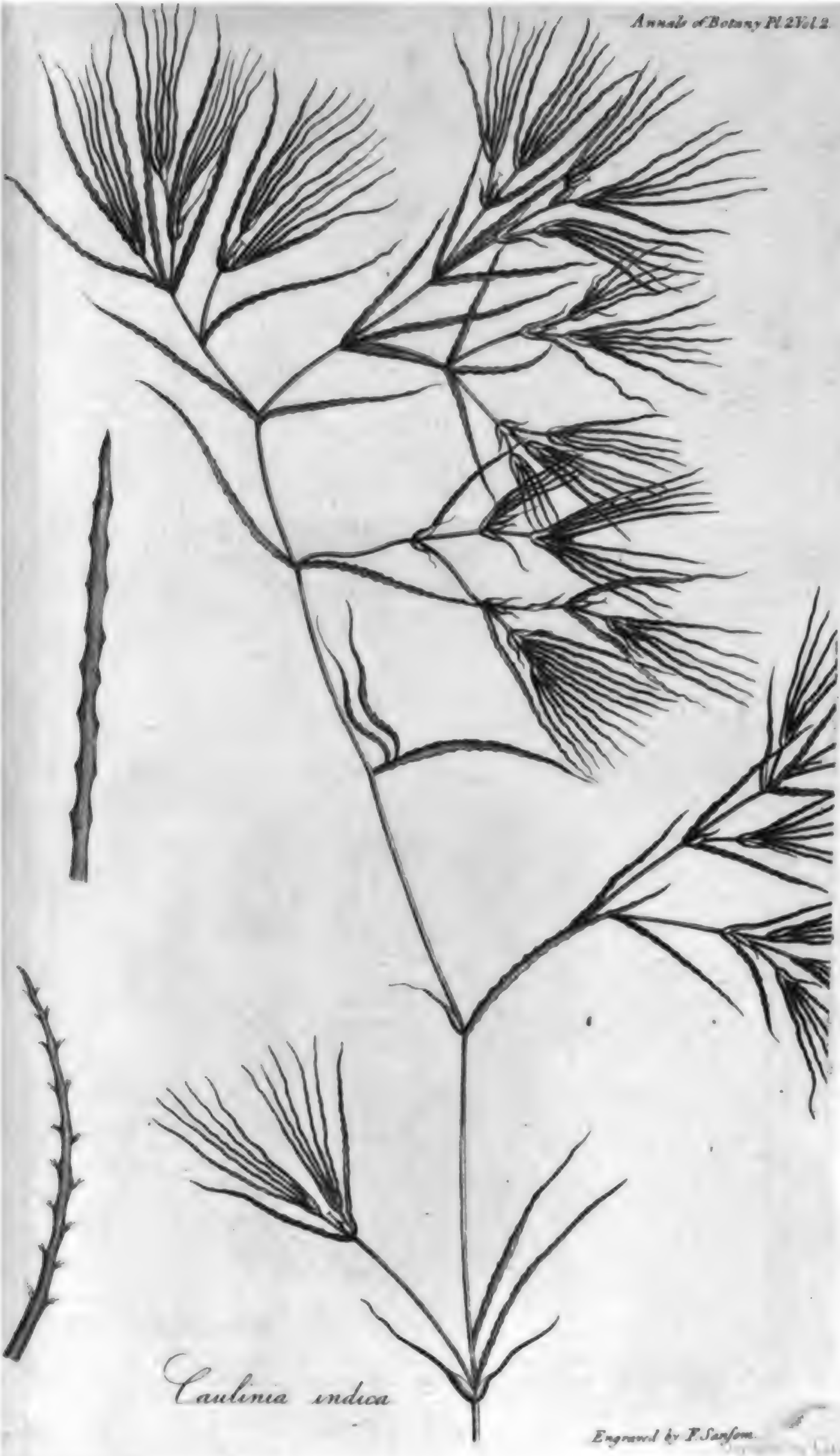

Caulinia indica

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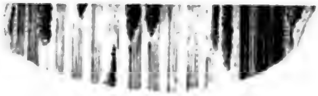

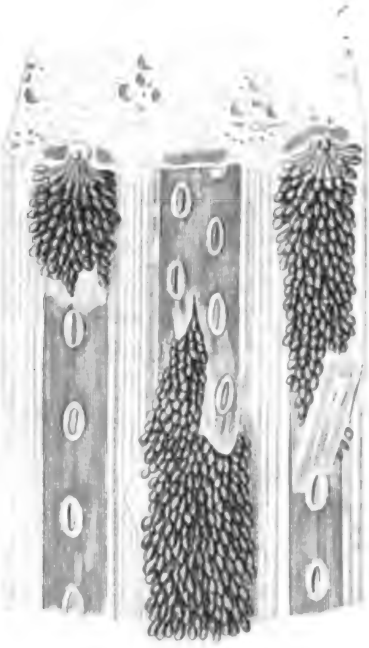

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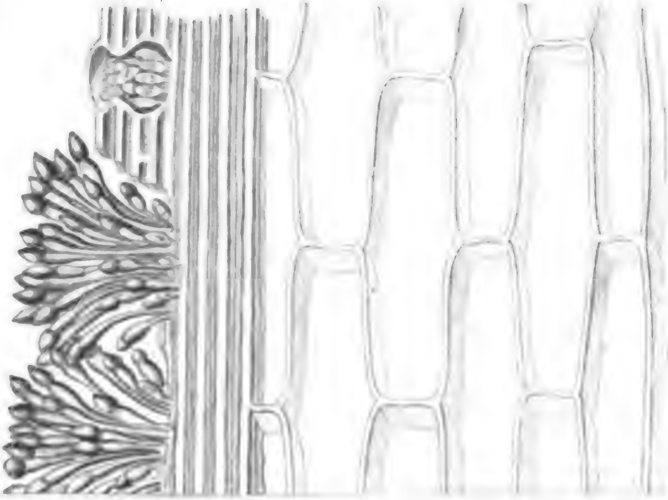

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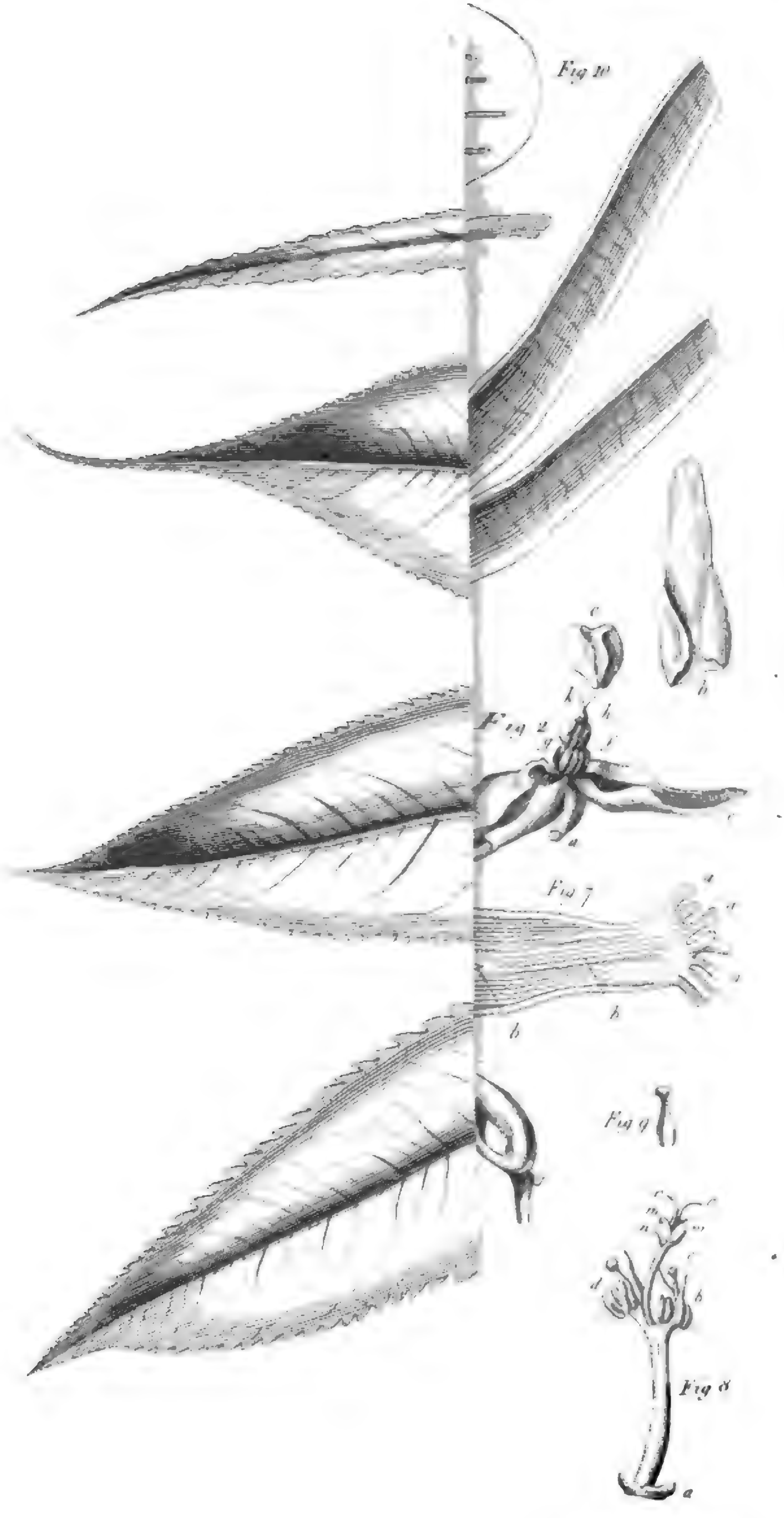
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American willows

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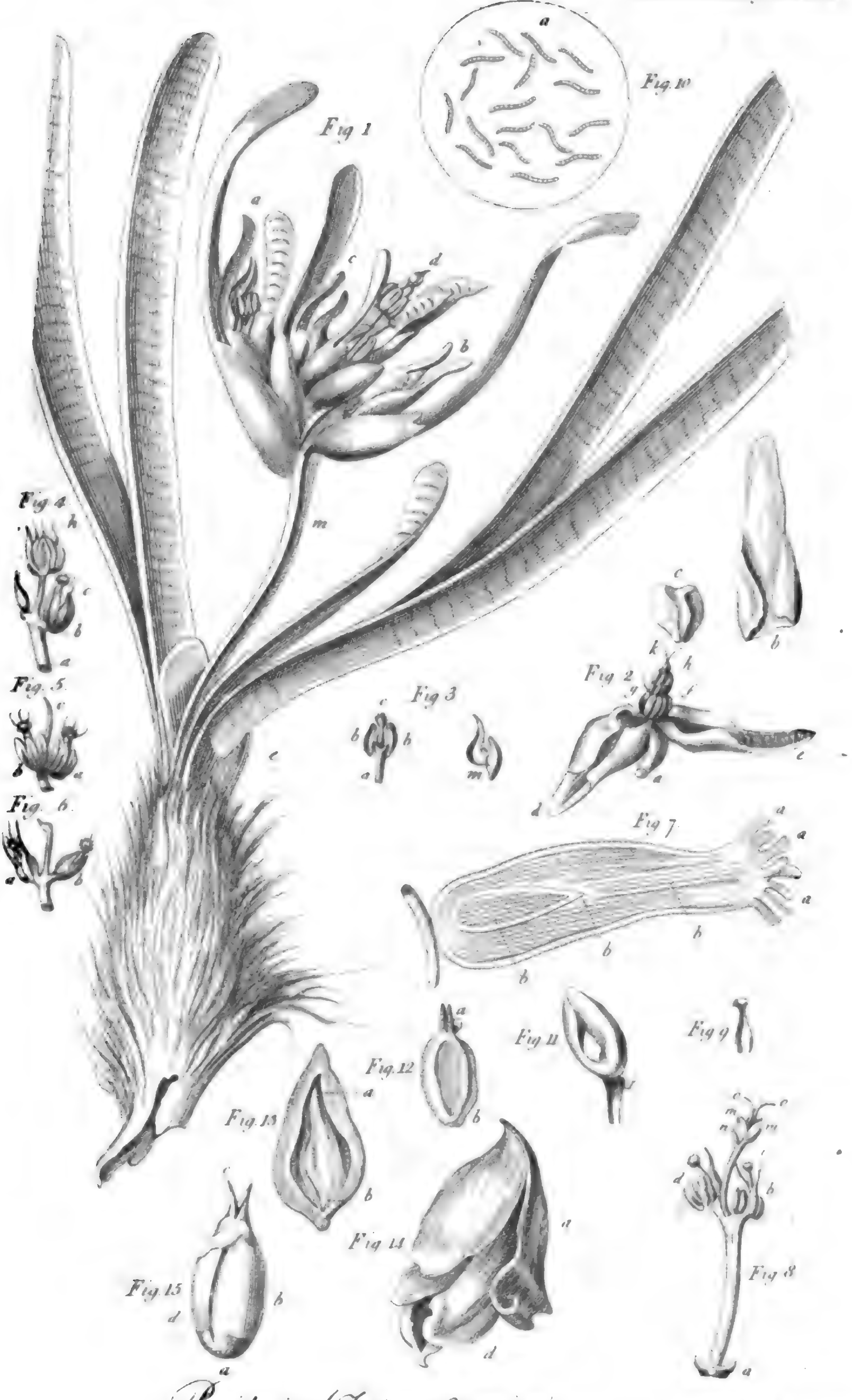
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Posidonia (Zostera Oceanica)

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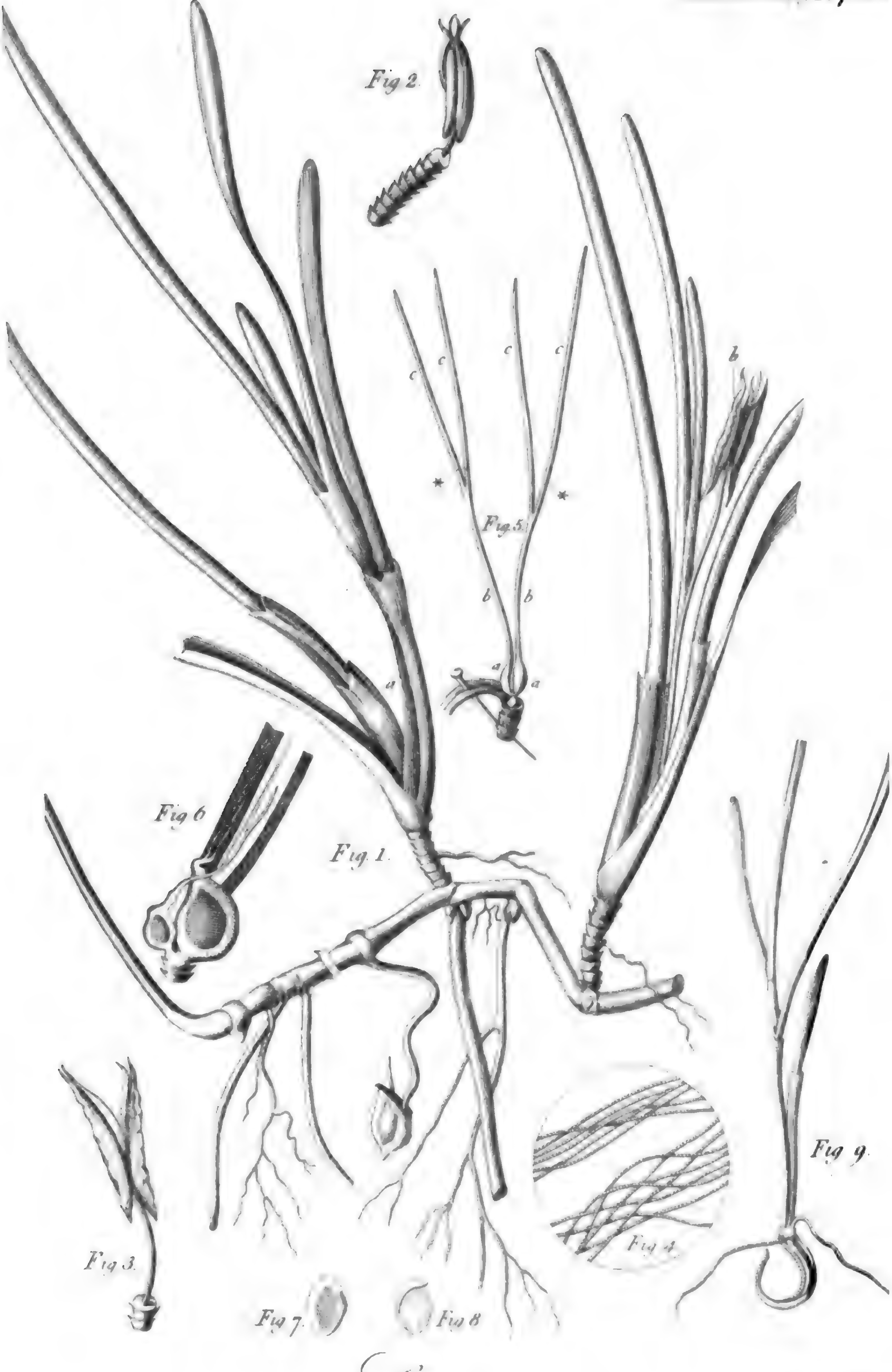
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Cymodocea.

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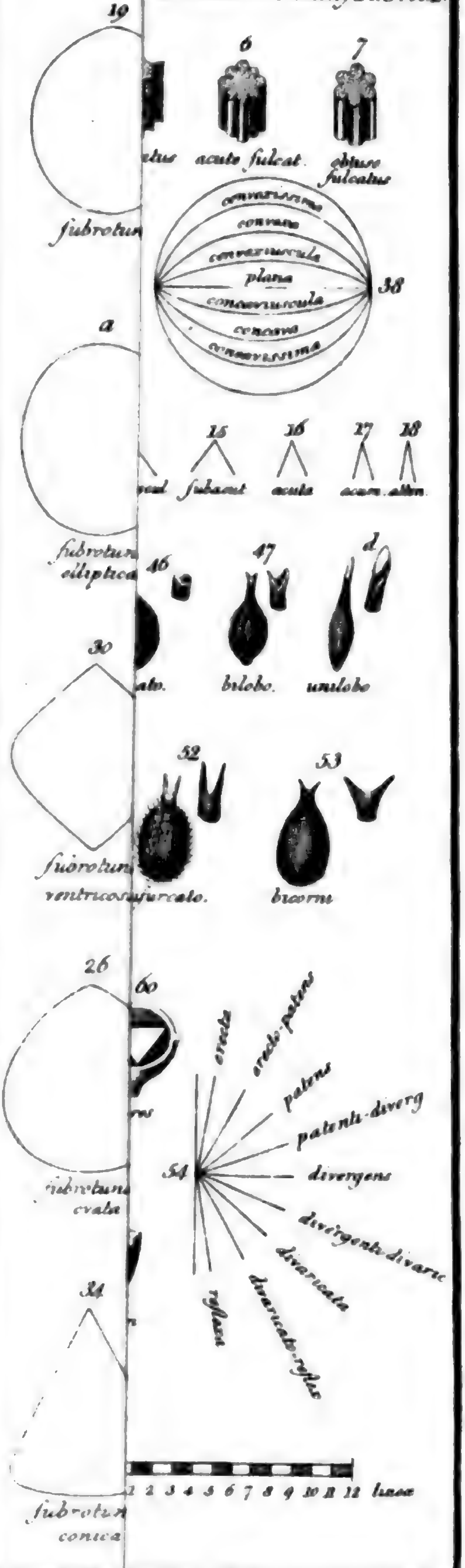
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American willows

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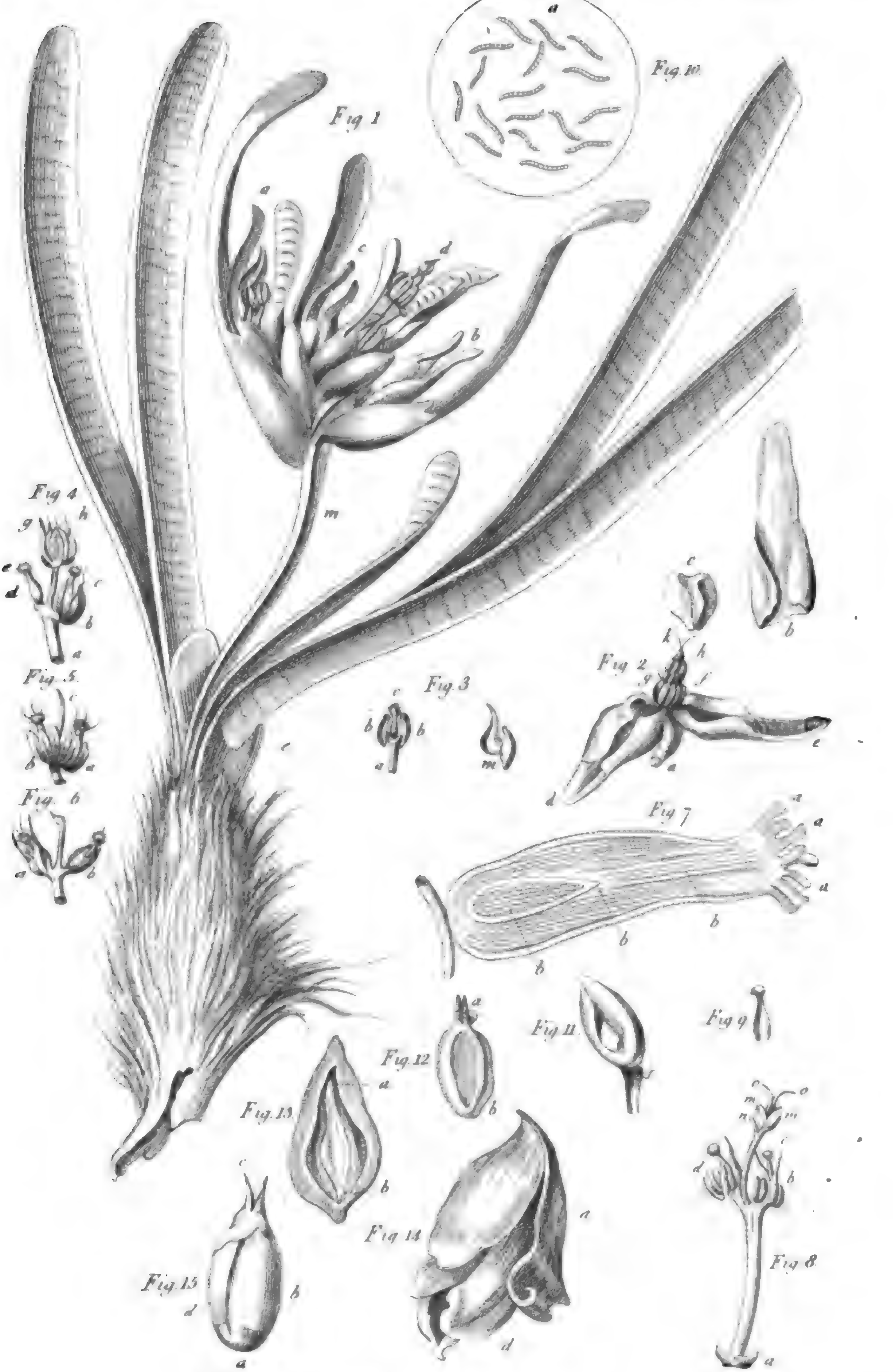
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Fig. 6
a
b
Fig. 7
a
a
a
a
b
b
b
Fig. 9
Fig. 11
Fig. 12
a
b
Fig. 13
a
b
Fig. 14
a
d
Fig. 15
c
b
d
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Fig. 8
o
o
m
m
n
c
d
b
a

Posidonia (Zostera Oceanica)

Engraved by F. Sansom

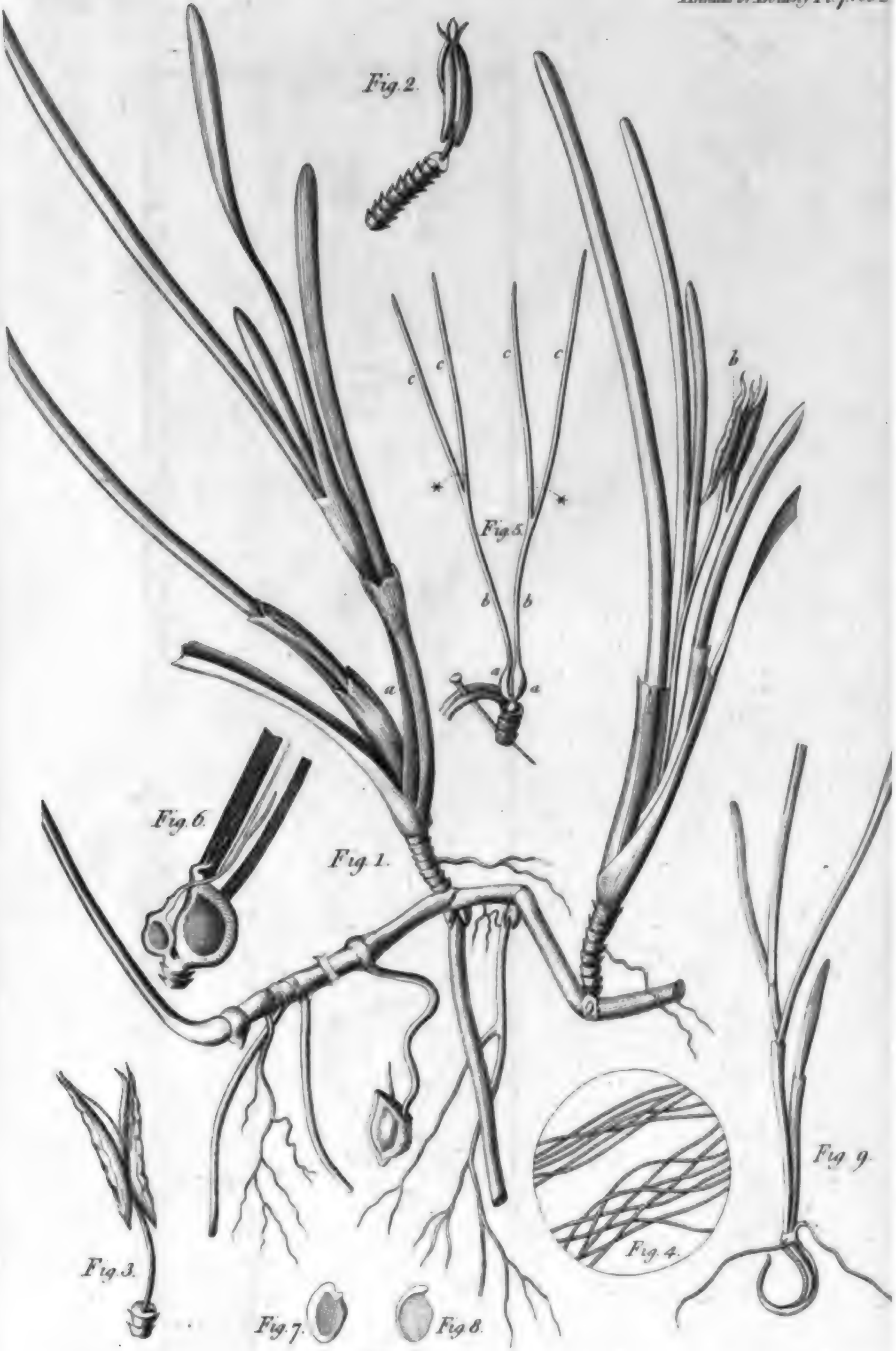
Fig. 2.
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Fig. 5.
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Fig. 6.
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Fig. 3.
Fig. 4.
Fig. 7.
Fig. 8.
Fig. 9.

Cymodocea

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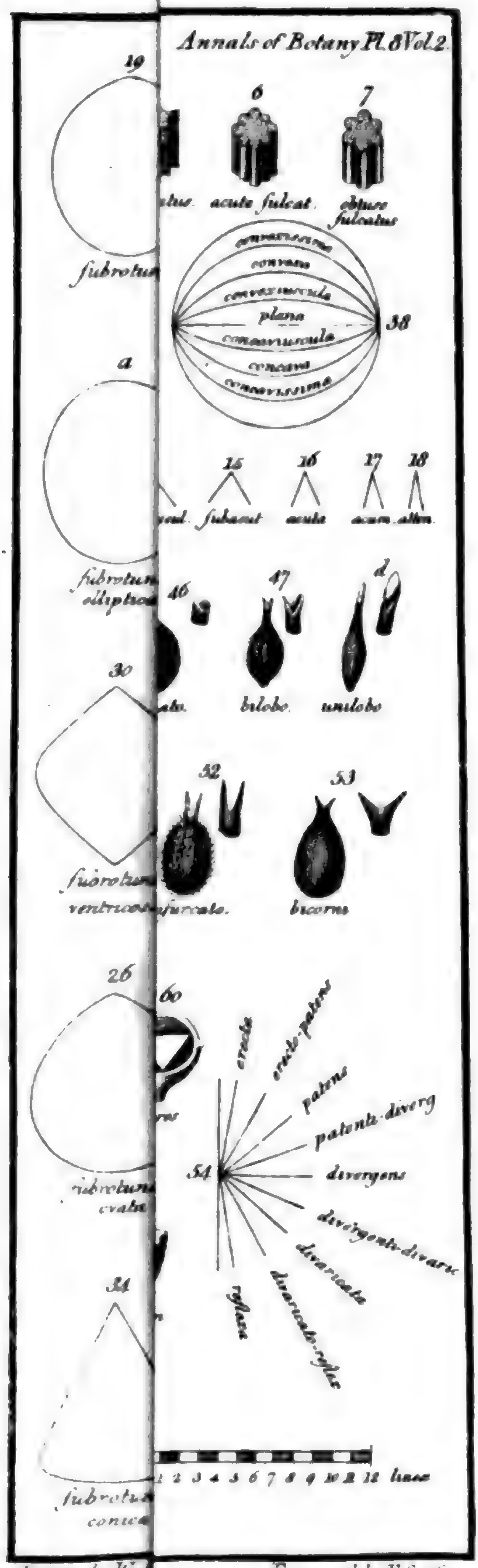
Annals of Botany Pl. 8 Vol. 2.
19
6
7
tus.
acute fulcat.
obtuse fulcatus
fubrotun
convexissima
convexa
convexiuscula
plana
concaviuscula
concava
concavissima
38
a
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16
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18
ud.
fubacut
acuta
acum.
attin.
fubrotun elliptica
46
47
d
ato.
bilobo.
unilobo
30
52
53
fubrotun ventricos
furcato.
bicorne
26
60
fubrotun ovata
erecta
erecto-patens
patens
patenti-diverg
divergens
divergenti-divaric
divaricata
divaricato-reflex
reflexa
54
31
fubrotun conica
1 2 3 4 5 6 7 8 9 10 11 12 lines

Drawn by Wal
Engraved by F. Sansom

Annals of Botany Pl. 9. Vol 2

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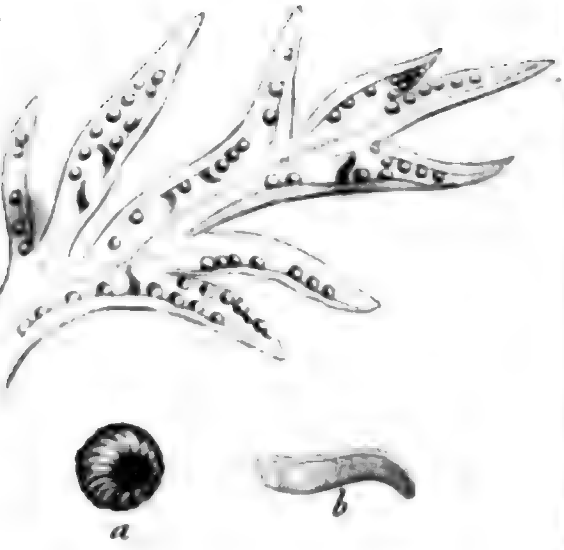

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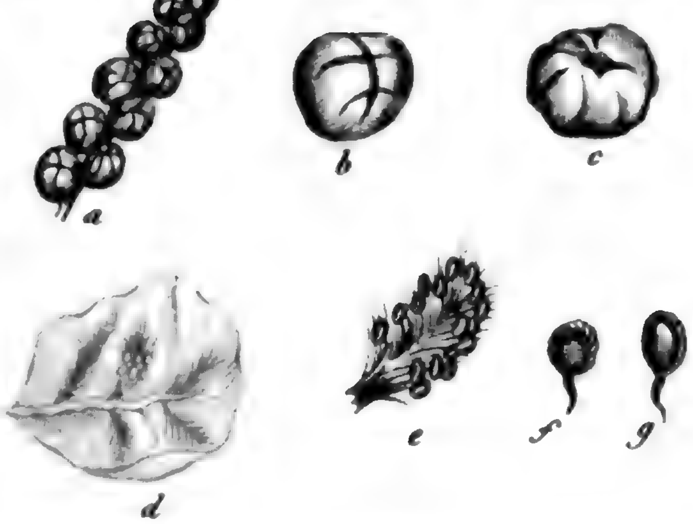

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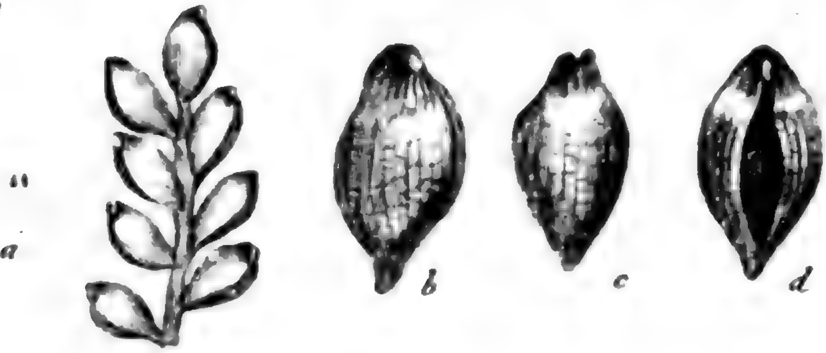

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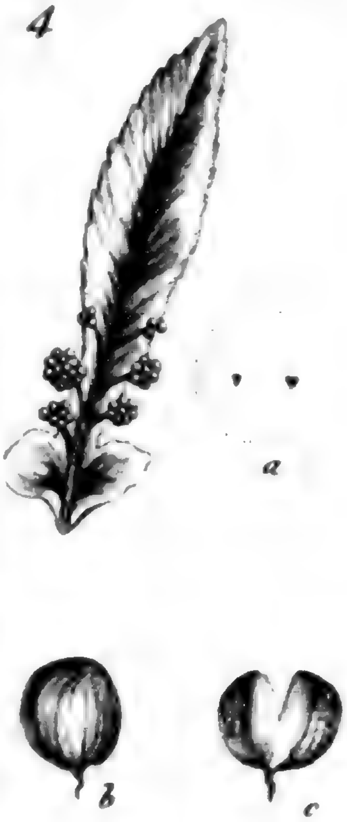

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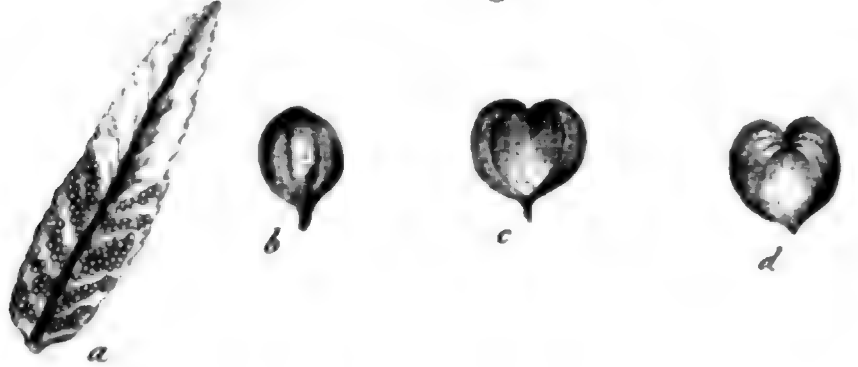

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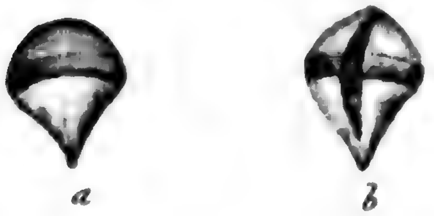

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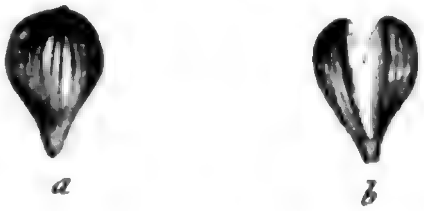

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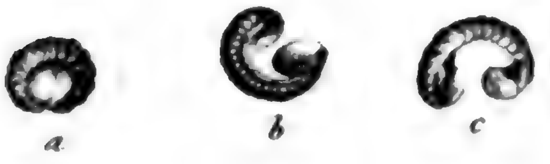

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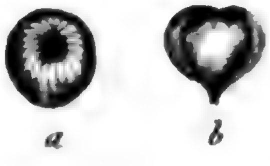

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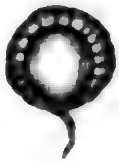
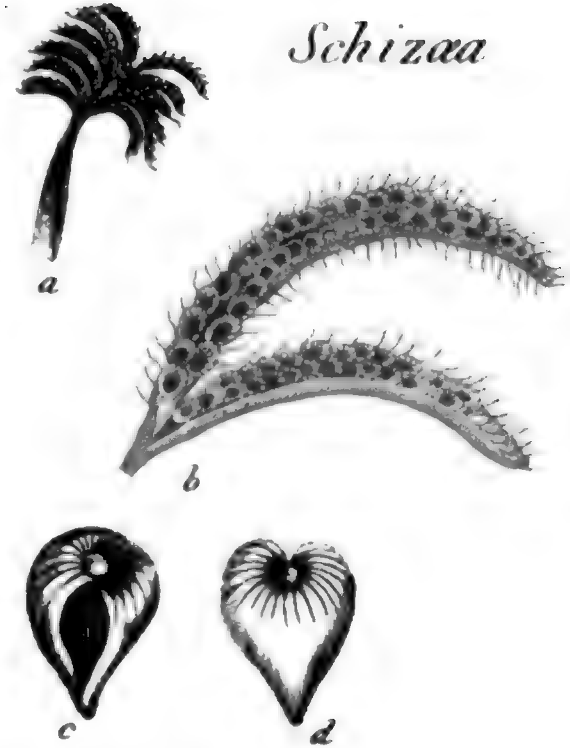
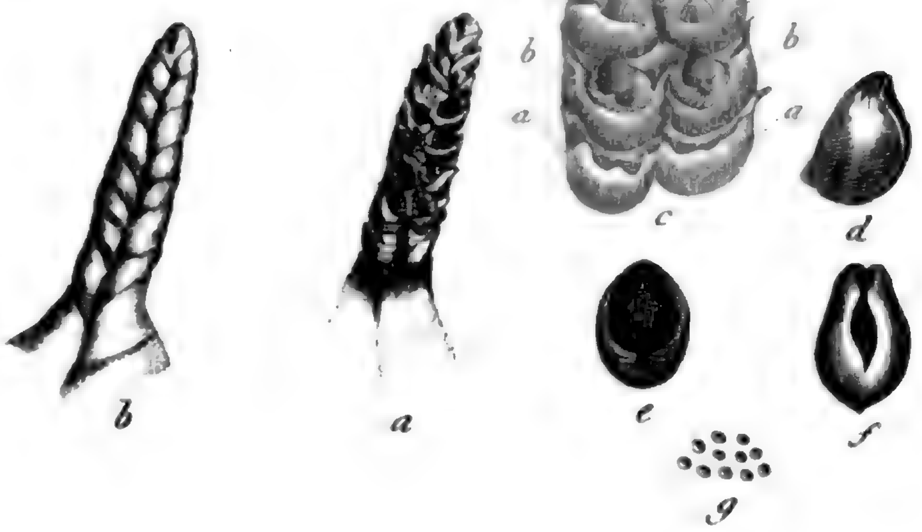


Engraved by J. Linton

I *Schizæa*



II *Lygodium.*


b
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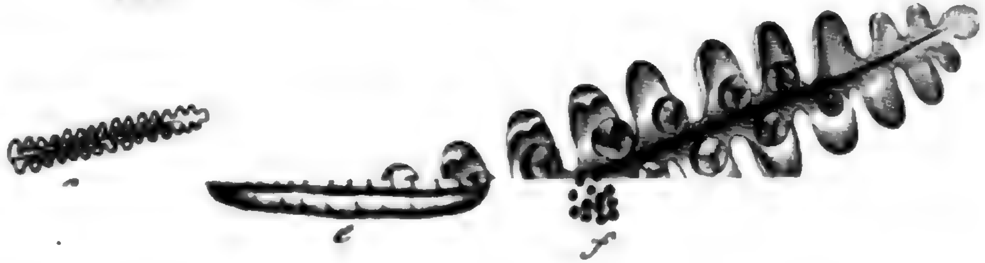
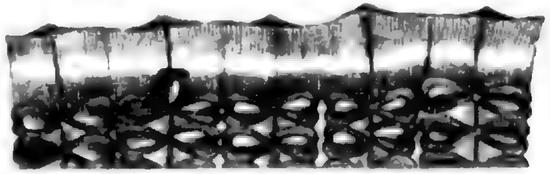
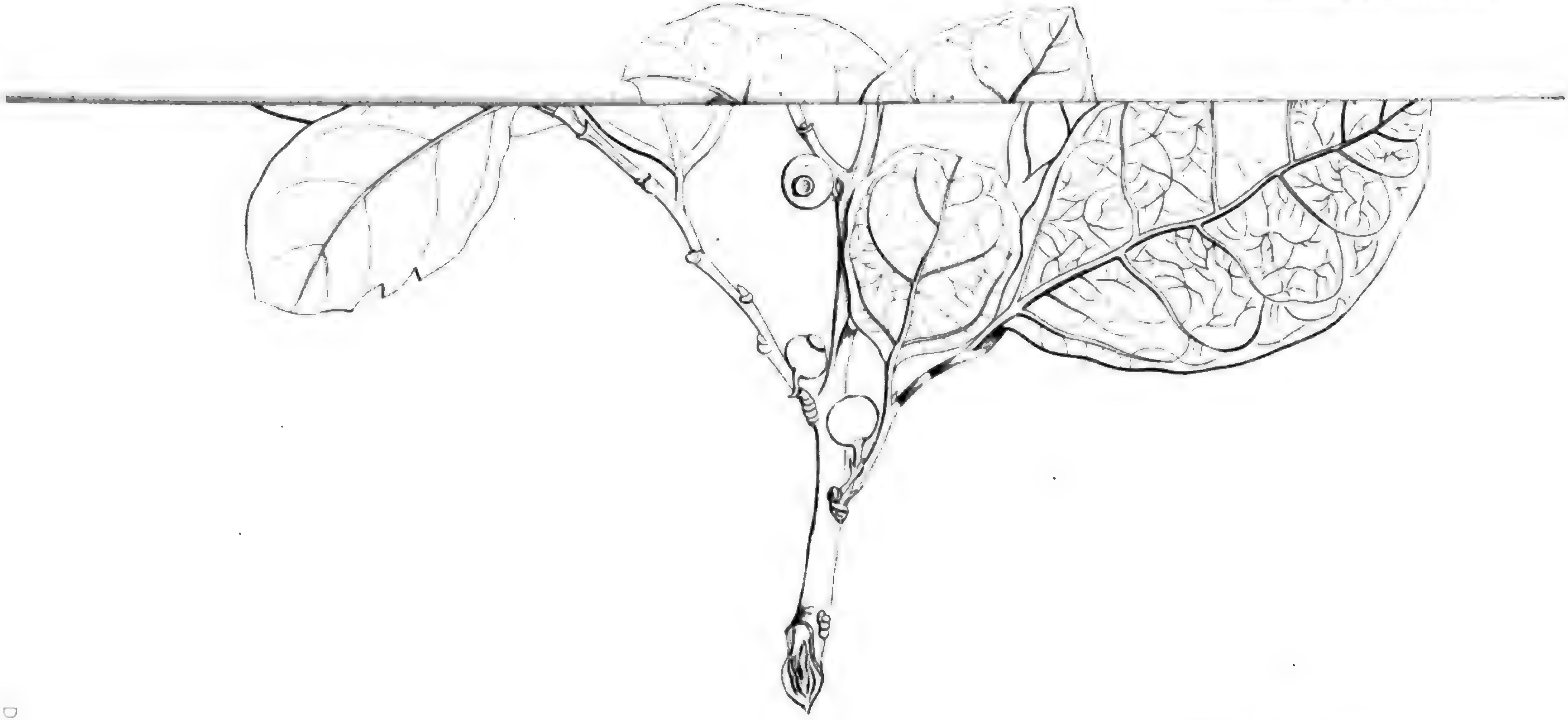
III *Gleichenia*



IV *Angiopteris*

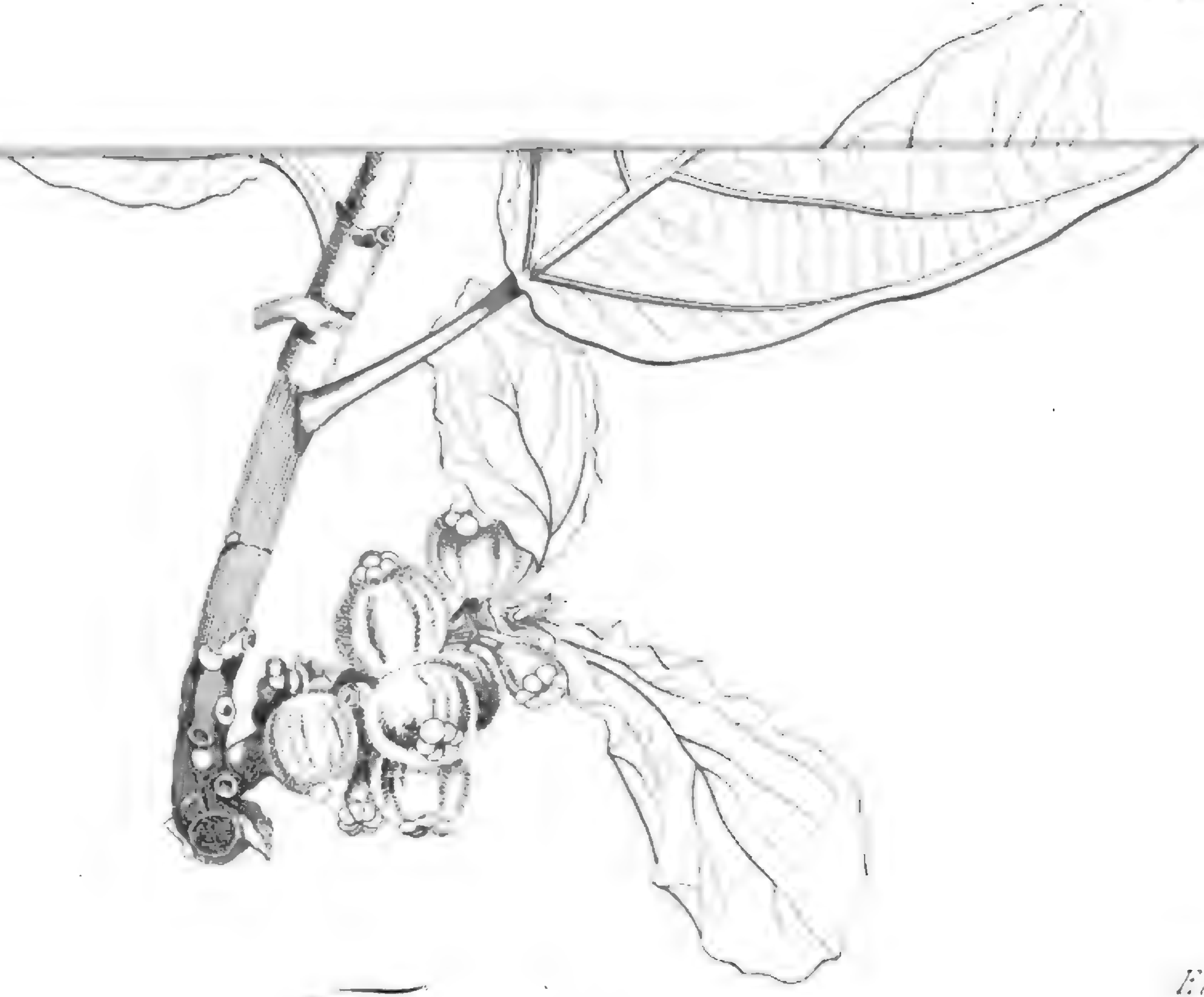




Etch'd by F. Sansom

Ficus parasitica

Annals of Botany Pl 12 Vol 2



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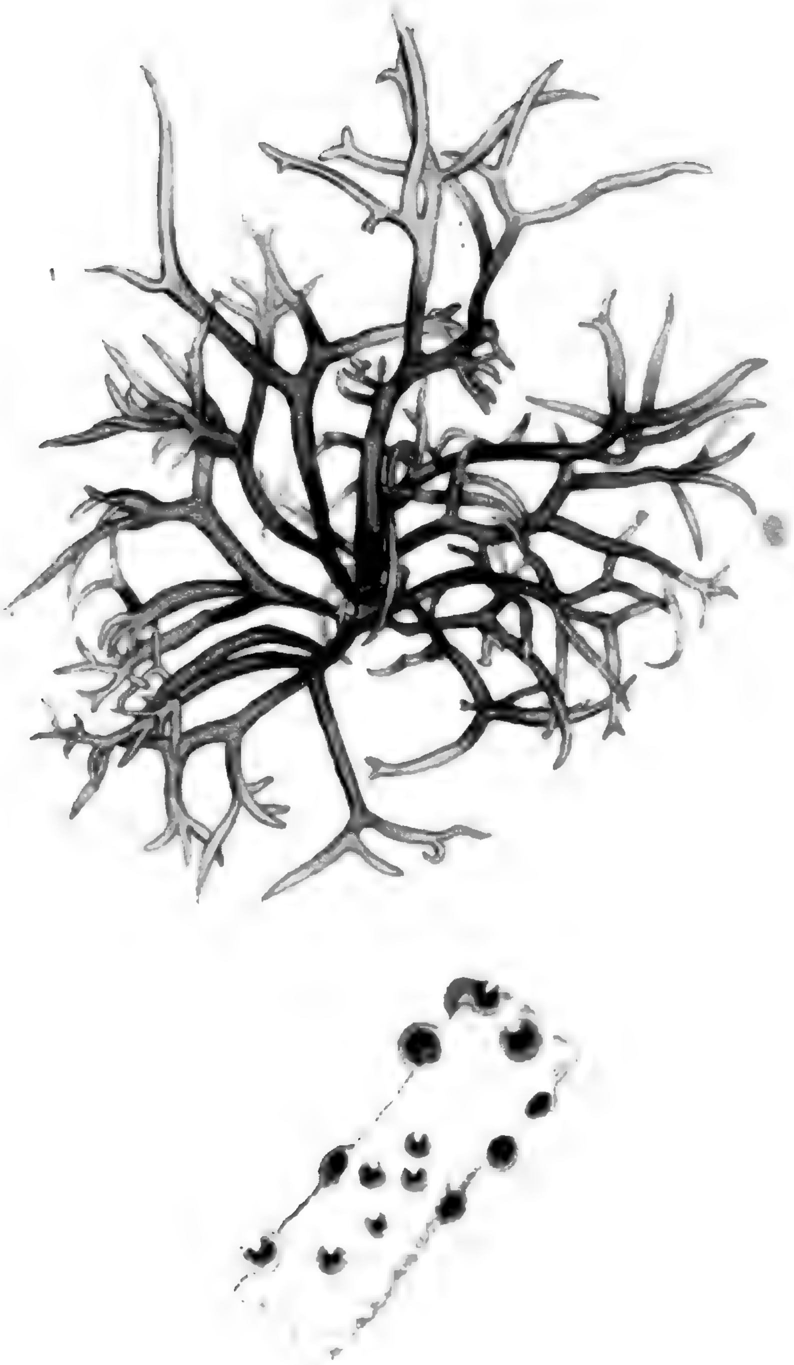
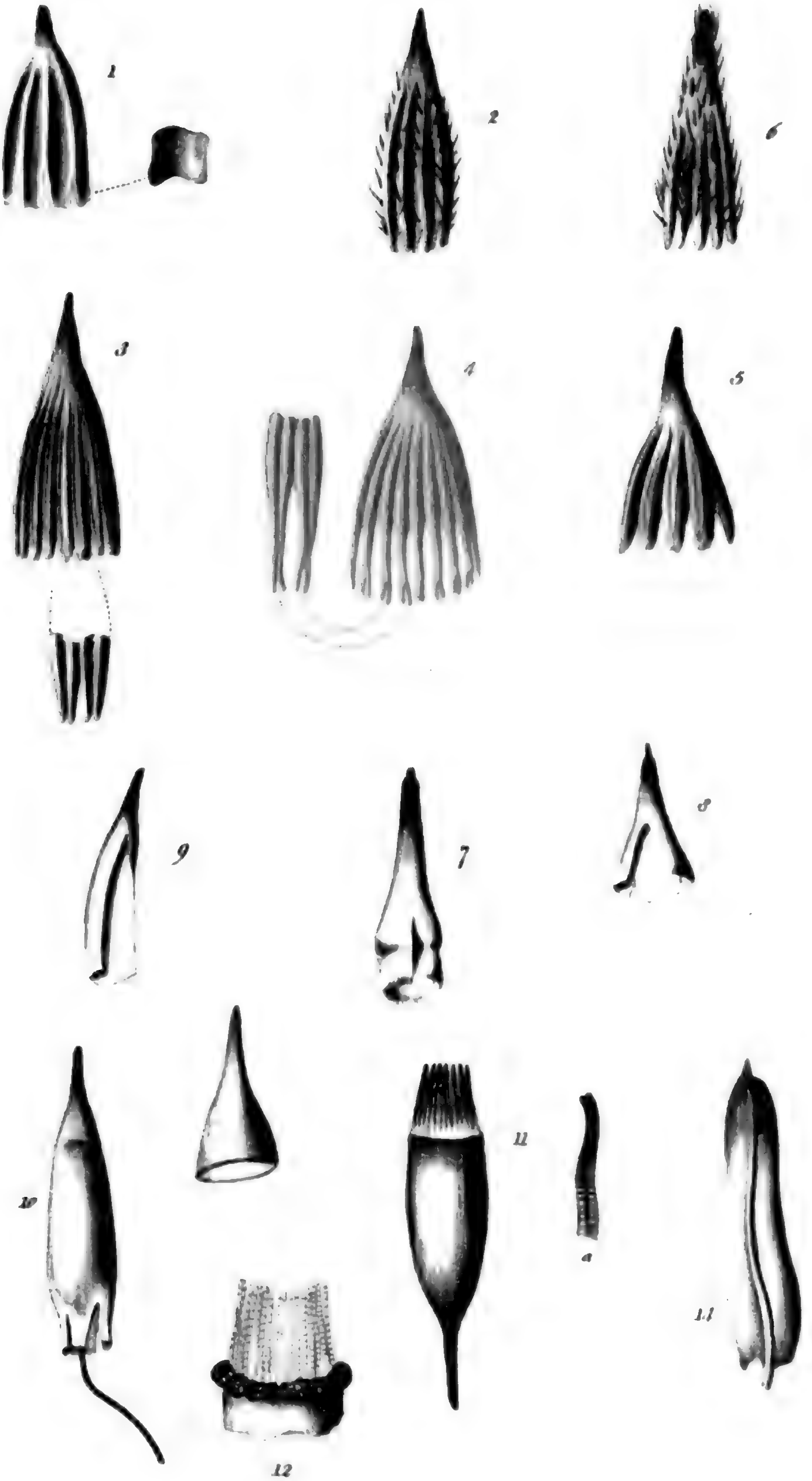
Ficus mollis



Fucus tenax. T.

Engraved by F. Sansom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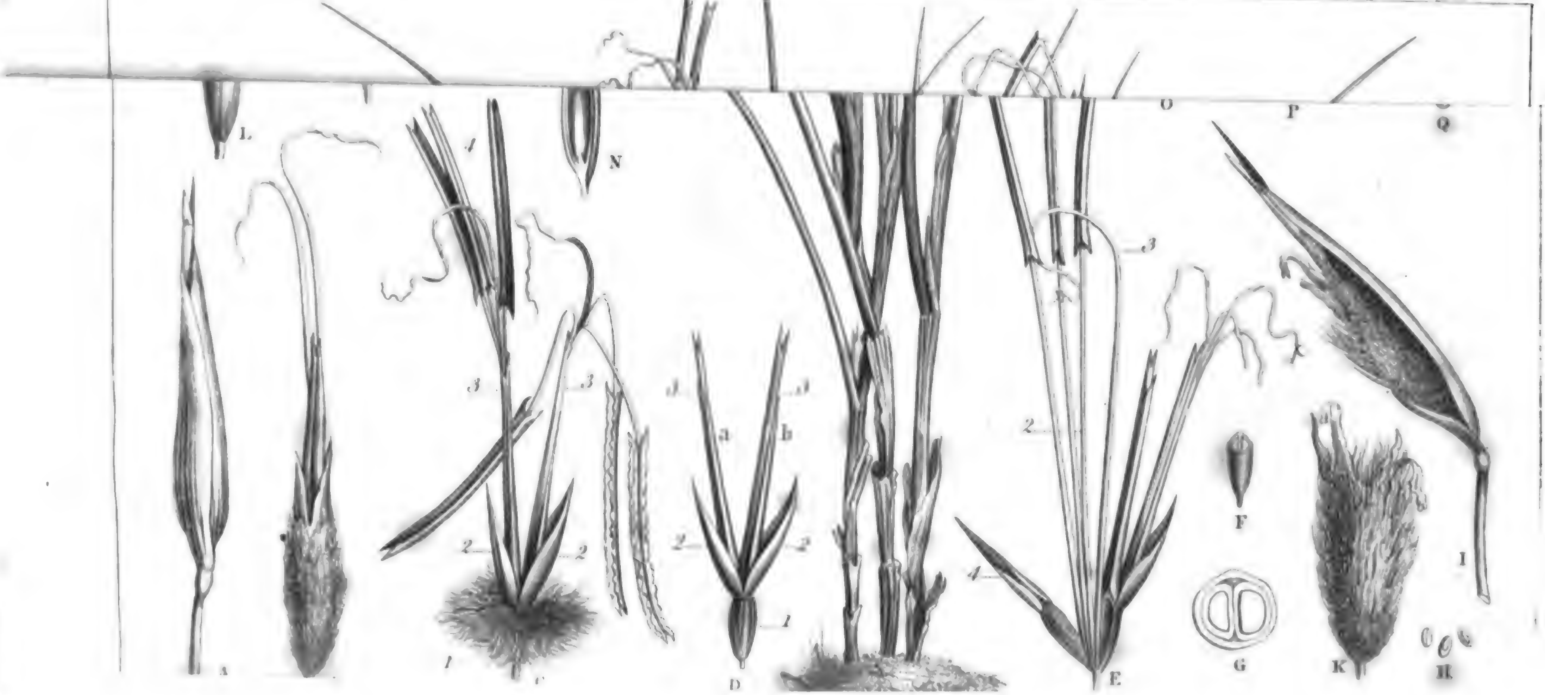
Engraved by [illegible]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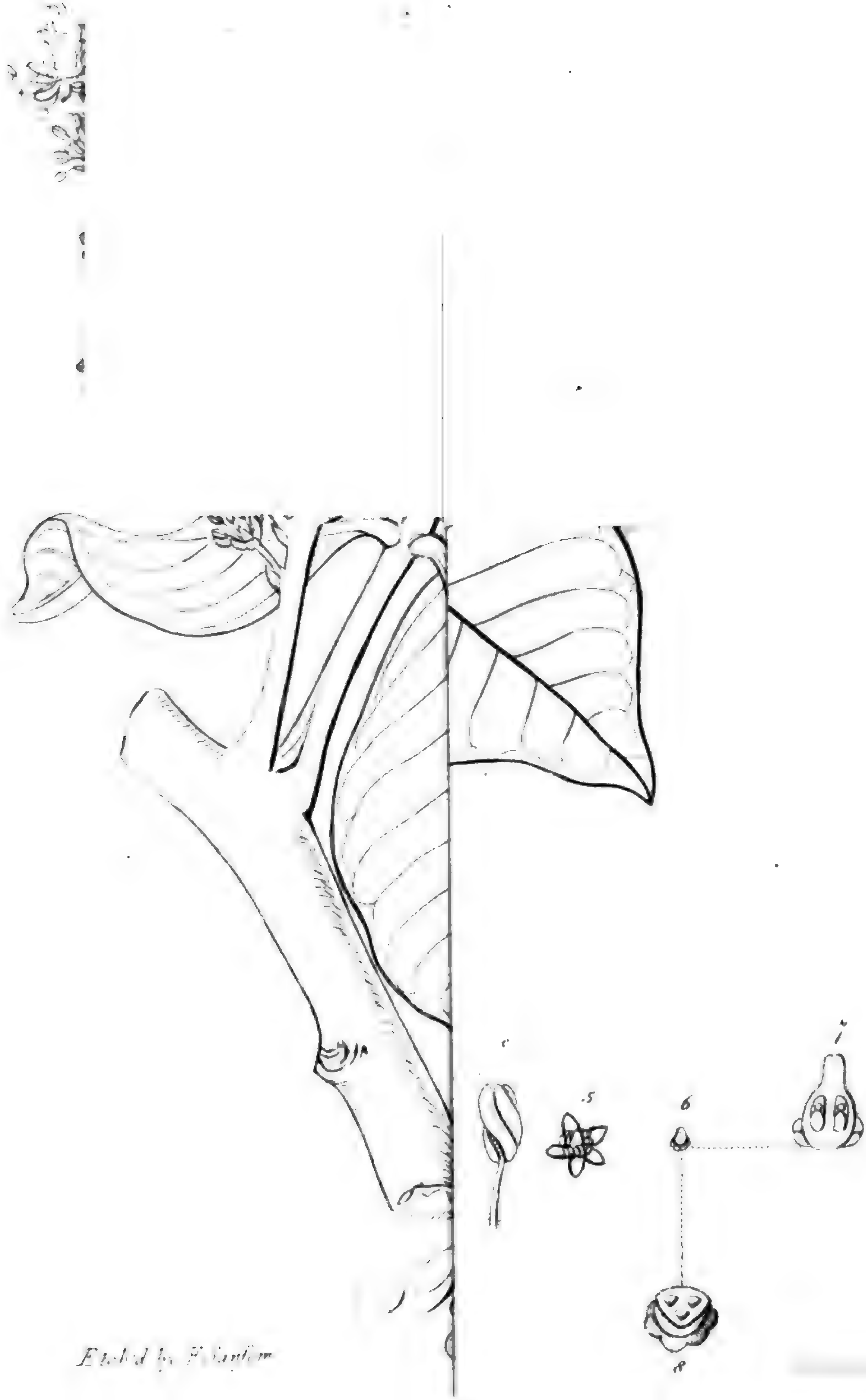
Pl. V. 12



Etched by F. Sansom

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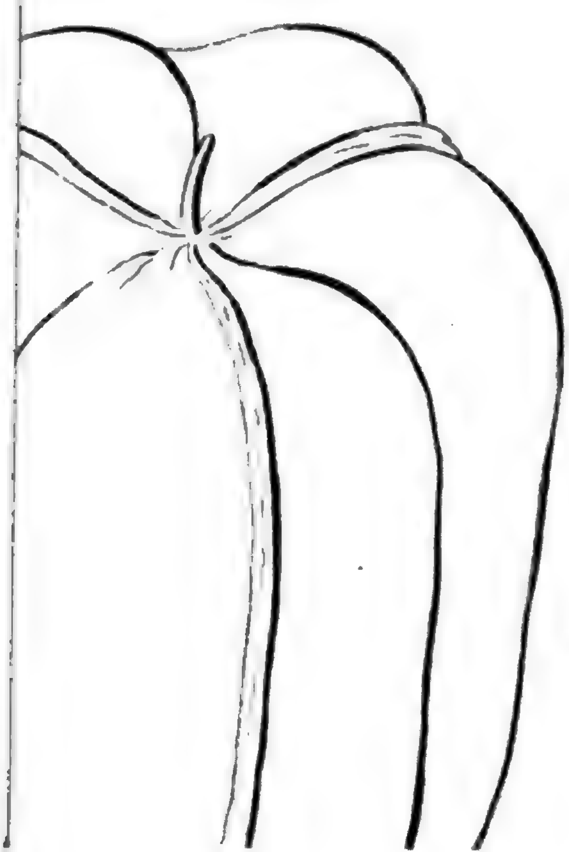

Mit 17 Tafeln
vom 13 April 67

2 vol. 32.6
9.20